LOOK CLOSELY

Are flat panels the right choice for you? We'll help you decide. Pages 76, 78

A DAY IN THE LIFE

We follow IT project manager Scott Farr to find out what that job is all about. Page 48

JAVA APPLETS

QuickStudy: Applets may make a Web site more interactive, but downloading them takes time. Page 72

COMPUTERWORLD

THE NEWSPAPER FOR IT LEADERS • WWW.COMPUTERWORLD.COM

MAY 3, 1999 • VOL. 33 • NO. 18 • $1 COPY

FEDS PROBE FOR H-1B VISA ABUSE

Problems at a Detroit-area IT services firm spark wider scrutiny of employers

BY BARB COLE-GOMOLSKI

LABOR WOES

One outsourcer's legal trouble has the government looking more closely at the practices of IT services firms that hire most of their workers from overseas, *Computerworld* has learned.

An ongoing Immigration and Naturalization Service examination of practices at Quality Information Systems Inc. in Southfield, Mich., has prompted the agency to increase its scrutiny of information technology services firms nationally, a spokeswoman said. Agency officials declined further comment.

In the Michigan case, the INS alleges that the H-1B applications of 68 workers at QIS contained false information concerning pay and job locations. Since an INS raid of QIS Dec. 15, the company's president has been indicted by a federal grand jury for allegedly removing computer equipment from his office to prevent its seizure, said Ken Chadwell, an assistant U.S. attorney in Detroit.

In two interviews, QIS President Subhaker "Sam" Surapenini declined to comment about specific allegations. He said he believes complaints by disgruntled ex-employees that are intended to discredit him prompted a government investigation.

Last year, the computer industry lobbied hard and eventually won an extra 140,000 H-1B visas over the next three years as a partial answer to the IT labor shortage. Those visas

H-1B Visas, page 16

LARRY GOODE

SOFTWARE GANGSTERS

POLICE RAIDS in Southern California have uncovered warehouses full of software replicator machines and huge stacks of counterfeit Microsoft software packages — right down to the fake hologram. As senior editor Kim S. Nash reports, organized crime rings in Asia make tens of millions of dollars on software piracy, then use the profits to fund drug-running, prostitution and other crimes.

Report is on page 24.

LINUX GUSHES SAVINGS FOR OIL GIANT

Switch from IBM saves Hess nearly $2M

BY DAVID ORENSTEIN

Saddled with low oil prices and a need to cut costs, global oil giant Amerada Hess Corp. is saving millions of dollars by replacing a costly IBM supercomputer with high-end parallel clusters running Linux, the free Unix variant that some CIOs still regard as a wild card.

A 32-node Linux cluster, called a Beowulf supercomputer, lets the company render detailed 3-D images of the seafloor from terabytes of data.

The $130,000 Beowulf system performs the task in about the same time — two weeks — as the 32-node IBM SP2 system running AIX that the company paid $2 million to lease for three years, said Vic Forsyth, Amerada Hess' Houston-based manager of geophysical systems.

Though the company could have saved at least hundreds of thousands of dollars by opting to set up Windows NT clusters, porting its Unix rendering application would have been a huge chore, Forsyth

Linux, page 97

Handsome Payoff

Amerada Hess helped cut oil exploration costs by more than one third by adopting Linux:

- **Cost Savings:** The Beowulf system cost $130,000. Amerada Hess paid $2 million to lease an IBM SP2 system for three years.
- **Performance:** The Beowulf clusters are 80% as fast as the IBM SP2.
- **Hardware/Software Swap:** Six parallel supercomputers that run Red Hat's Linux 5.1 are replacing an IBM SP2 system running AIX.
- **Business Value:** Able to save $1.5 million with minimal performance hit.

SOURCE: AMERADA HESS

'OLD' LAN GEAR POSES YEAR 2000 RISK

Y2K compliance an issue at 10% of U.S. firms

BY BOB WALLACE

Companies relying on internetworking equipment that's two or more years old risk LAN failures in the year 2000 that would deny end users access to mission-critical applications.

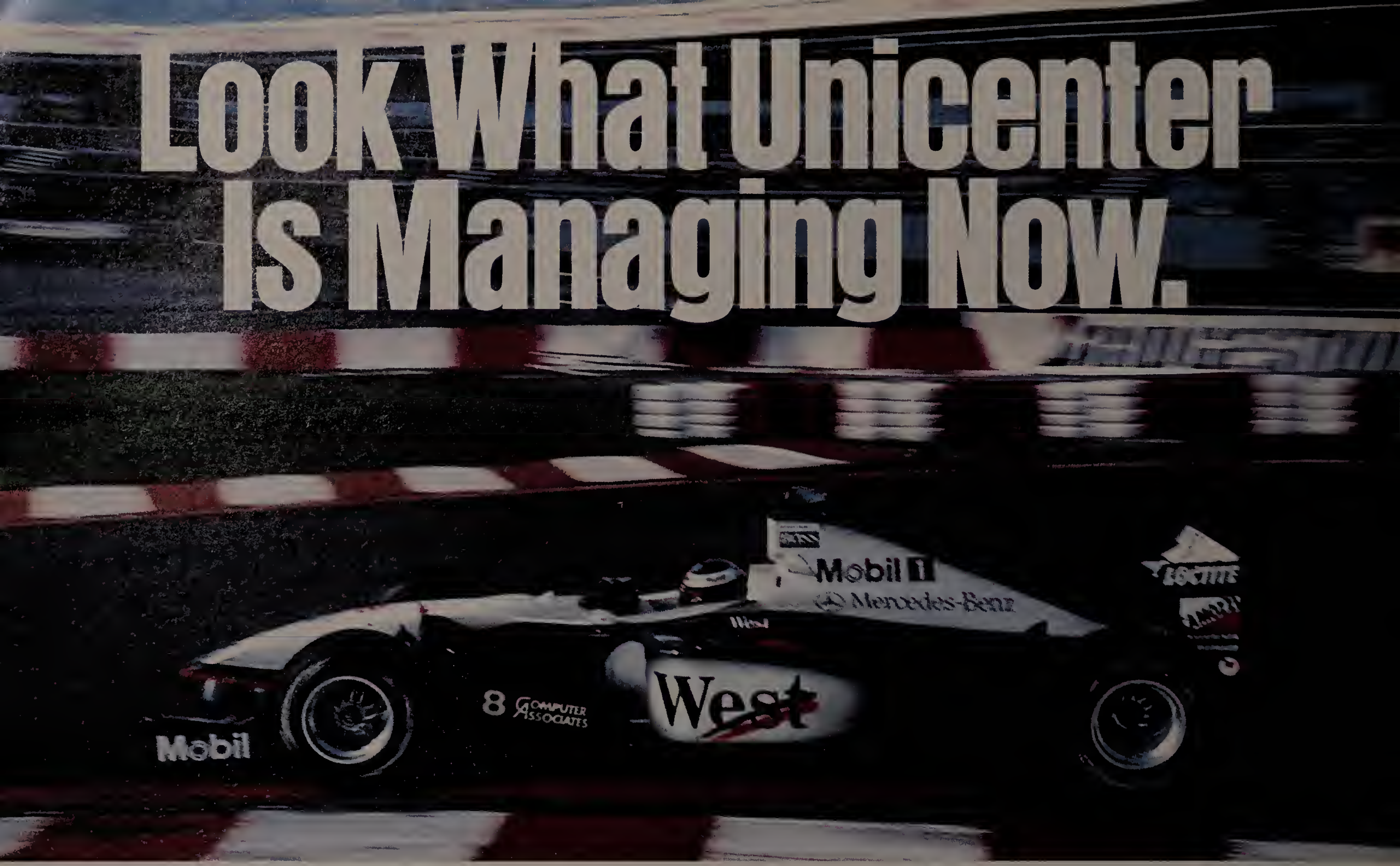
That's because the top four networking vendors aren't testing most "older" products and are advising users to upgrade software and replace devices that aren't year 2000-compliant.

Many have already purchased or plan to upgrade to Y2K-compliant equipment, so there isn't a lot of concern being voiced by users about the issue. But experts say about 10% of U.S. companies are at risk of suffering network troubles caused by the year 2000 bug.

"People expect the network

LAN Gear, page 97

NEWSPAPER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ROAD WEARY?

IT road warriors share tips on coping with and making the best of travel. Page 53

ELLEN WEINSTEIN

TRUSTING THE NET

Online scams make it tough for banks to do business over the Net, so industry groups are working to make it more secure. Banks must make sure customers can trust in the Net, says Citigroup CIO Steve Katz (pictured). Page 46

PETER SERLING

COMPUTERWORLD THIS WEEK

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4 **MORE EUROPEAN** companies forge ahead with business-critical applications written in Java.

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8 **SAP IS EXPECTED** to announce e-commerce applications at its user conference in France this week.

12 **SUN RELEASES** HotSpot Java virtual machine, launches i-Planet software that would give users server access via the Internet.

14 **U.S. RETAILERS WORRY** about the Y2K-readiness of global shipping companies.

16 **INTERNET2** developers say systems that can prioritize traffic are needed to make use of the enormous bandwidth.

OPINION

30 **IT WILL FACE** new challenges when users take more cell phones with screens on the road to browse the Web, Dan Gillmor writes

31 **COMPAQ'S TROUBLES** say a lot about the difficulties of incorporating the Web into traditional business practices. David Moschella explains.

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40 **SAW MAKER SLASHES** costs with flow manufacturing systems but requires huge refitting.

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42 **VENDORS GOING OVER** your head to sell to the boss? Learn how to thwart them.

OPINION

44 **HARDWARE COSTS** more than it delivers — at least apparently. Paul A. Strassmann explains why.

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60 **Q&A: MICROSOFT'S** Jim Allchin seeks to defuse Win 2000 migration fears, promises online support.

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HARDWARE

64 **NEW PRODUCTS** aim to bridge legacy systems and newer NT, Unix environments.

NETWORKS

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66 **SNA/IP CONVERGENCE:** We talk to an insurer that's taking the plunge.

70 **EMERGING COMPANIES:** WebCriteria attempts to quantify the value of large Web sites.

74 **VPNs ENTICE** as cheap remote-access tools, but IT waits for industry, technology to mature.

76 **FLAT-PANEL DISPLAYS:** Slim, sexy — and, at well over $1,000 a pop, pricey.

80 **FLASHBACK:** In 1966, successful instruments maker Hewlett-Packard sold its first computer.

84 **NETWORK PROS** face long hours and tedious work. No wonder they're in short supply.

> I WANT PEOPLE TO WORK ON MY FIXES RATHER THAN [BE] PREPARING FOR LITIGATION.
>
> LISA BENDER, IS MANAGER, FALCON PLASTICS, ON WHY SHE SUPPORTS PROPOSED Y2K LEGISLATION THAT WOULD SET A 90-DAY "COOLING OFF" PERIOD BEFORE LITIGATION CAN COMMENCE. SEE PAGE 38.

AT DEADLINE

EDS Lays Off 5,200

Information technology services giant Electronic Data Systems Corp. in Plano, Texas, has cut 5,200 jobs, or about 4% of its workforce, and posted a loss of $20.6 million for the first quarter. The jobs were technical and administrative, a company spokesman said. The company blamed soft U.S. sales and restructuring costs for the shortfall. It suggested more cost cuts are coming.

'Y2K Act' Vote Up in Air

Senate Majority Leader Trent Lott (R-Miss.) last Thursday cast doubt on bringing the "Y2K Act" to limit year 2000 liability lawsuits to a full vote because Senate Democrats keep trying to attach unrelated measures to it, such as gun control and a minimum-wage measure. But some Republicans said there's still hope for the bill, which includes a bipartisan compromise to drop liability protections for corporate directors. Democrats won more consumer protections and eliminated many caps on punitive damages in the compromise. (See story, page 38.)

Privacy Hole Revealed

The Deja News Internet search engine recorded users' e-mail traffic since last year without their permission, reported Richard M. Smith, president of Phar Lap Software Inc. in Cambridge, Mass. Smith said the service also monitors users' clicks on external Web page links in a newsgroup message. A spokesman for Deja News said on Friday that the New York company would stop collecting e-mail information, adding, "We have never used this information to trace back clicks to individual users."

Short Takes

PLATINUM SOFTWARE CORP. this week plans to change its name to **EPICOR SOFTWARE CORP.**, following up a commitment that settled a lawsuit with **PLATINUM TECHNOLOGY INC.** . . . , In a deposition Friday in the **MICROSOFT CORP.** antitrust trial, lawyers for **SUN MICROSYSTEMS INC.** acted to close Chief Operating Officer Michael Popov's testimony about the America Online Inc.-Netscape merger. Sun has a stake in the merger.

EUROPEAN USERS TAKE ON JAVA FOR BIG JOBS

IT shops abroad behind U.S., but business deployments are on rise

BY CAROL SLIWA
PARIS

BANQUE GENERAL du Luxembourg is doing something that many U.S. companies still might be hesitant to try: an enterprisewide application, built by 70 developers, that relies on a million lines of Java code for a key business function.

Historically conservative, European companies have been slow to deploy Java applications for a variety of reasons. But a growing number are starting to take the Sun Microsystems Inc.-created language seriously enough to forge ahead with business-critical applications that rival those of U.S.-based companies.

That's a positive sign for Java's future — particularly given mounting user concerns that Microsoft Corp. may drop its Java support.

Popular Format

In fact, Gartner Group Inc. predicted that Java won't be marginalized by Microsoft and will become the most popular language and platform technology for network computing applications by 2004. In a presentation at the Java Enterprise Solutions Symposium here, Gartner estimated that worldwide Java adoption is 20% to 40% slower than in the U.S.

Java "is transitioning to the norm rather than the exception in the U.S. Here [in Europe], it's still the exception. But those exceptions . . . are no less advanced than the U.S.," said Daryl Plummer, an analyst at Stamford, Conn.-based Gartner Group.

At the Luxembourg bank, employees had to go to a different 3270 text-based screen for each of its roughly 20 mainframe applications. Customers who had savings accounts, loans and an investment portfolio had to wait for a bank employee to switch among the different applications.

With help from Andersen Consulting, the bank spent two years overhauling its mainframe-based architecture. It wrote custom code in both Java and Cobol to build a Java component-based system to integrate information and transaction interfaces from the various legacy databases.

Employees at the bank's 42 branches got an easier-to-use screen that can incorporate graphs, video, audio — even worldwide stock quotes — in one view. Banque General du Luxembourg can now focus on training workers to sell its products, said Marc Aguilar, technology director.

The Java component architecture also will make it easier to create an Internet banking site by year's end because developers will be able to reuse much of the code.

Like their U.S. counterparts, European developers said they find Java easier to work with than other object-oriented languages, which speeds development time.

They also like its platform independence and object-oriented model for connecting to legacy systems.

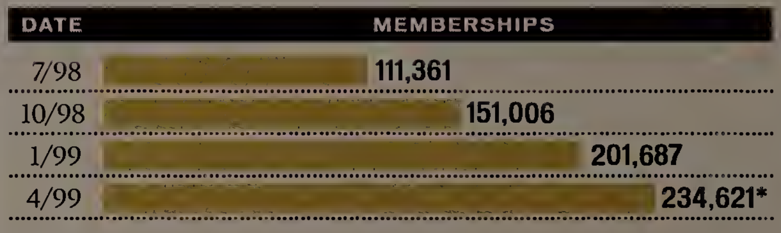
Those that have resisted Java bemoan its performance, are reluctant to rewrite existing legacy-based applications or claimed that they have trouble finding qualified application developers.

International broker Prebon Yamane Inc. chose Java to help build an extranet that will let it push prices — at the rate of hundreds per second — to the investment banks that buy and sell money through them. The London-based brokerage had been using an expensive, proprietary network to deal with its top customers.

On the server side, Java kept the company in sync with its vendor and client partners, said Patrick McGrath, information technology director for Prebon Yamane's operations in Europe, the Middle East and Africa. ◗

Java Developer Growth Overseas

Registered Java application developers in Europe, the Middle East and Asia:



* As of April 1, 1999

SOURCE SUN MICROSYSTEMS INC.

Exchange to Rely on Win2K Active Directory

Other 'Platinum' apps to leverage key facet of OS

BY SHARON GAUDIN

The popular Exchange e-mail server software will be the first of Microsoft Corp.'s applications to be optimized for the upcoming Windows 2000 operating system. Microsoft formally shipped Beta 3 of Windows 2000 last week.

The next upgrade to Microsoft Exchange, code-named Exchange Platinum, will depend on the Active Directory services inside Windows 2000. It won't be able to run with any other operating system — including Microsoft's own Windows NT 4.0.

Active Directory replaces the registry in Windows NT 4.0. The directory is like an electronic Yellow Pages that lists objects, files, devices and users running or located on the network. It provides a way to find the pieces of the network and better manage or communicate with them.

John Scannello, director of information technology planning at Consolidated Edison Company of New York Inc., said he's eager for a version of Exchange that uses Active Directory.

'Great Idea'

"If it works, it will be a great idea," Scannello said. "For the first time, we'll have one, central repository of directory types of information. It should be a much more standard way of doing things."

A Microsoft spokesman said that although other Microsoft products, including pieces of the BackOffice Suite, will join the Platinum family, they will only take advantage of Active Directory — not depend on it like Exchange.

That means future upgrades of those other products should also run on other versions of the Windows platform.

Doug Strumberger, an Exchange product manager, explained that Exchange Platinum will use Active Directory instead of having a directory of its own. "Administrators will create a single enterprise directory that covers both networking access and security, and messaging access and security," he said. "We'll be able to administer that directory as a single, unified whole."

There is no release date for either a beta version of Exchange Platinum or the final release. "We are shooting for . . . as soon after Windows 2000 ships as possible," Strumberger said. ◗

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WebFOCUS at 9:30.
I developed reports myself and put them on the Web by noon."
SONY

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Gary Fischer, Data Warehousing Manager at Sony Electronics says, "It gives everyone from senior executives to operational staff the answers they need when they need them."

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AMAZON HINTS AT DATA SALES

Online bookseller's losses grow, but moves suggest plan to sell shopping-behavior info

BY STEWART DECK

SELLING MORE books and CDs hasn't stopped Amazon.com Inc.'s losses, so the electronic retailer might be positioning itself to become a dominant provider of online shopping-behavior data, industry watchers said.

Financial results released last week show continued sales growth — and mounting losses. The company also acquired the following three companies, two of which should bolster its ability to gather online consumer shopping data:

- San Francisco-based Alexa Internet, a browser add-on service that offers Web surfers information about the pages they're visiting and suggests related sites.
- Redwood City, Calif.-based Accept.com Inc., a company that develops online transaction technology.
- Sandwich, Mass.-based Exchange.com, an online used- and antiquarian-book dealer that operates rare book and music memorabilia Web sites at *www.bibliofind.com* and *www.musicfile.com*, respectively.

The purchase prices totaled approximately $645 million.

In the quarter ended March 31, Amazon.com counted net sales of $293.6 million, a 236% increase from the same quarter last year, before music and video sales were added to the site. It posted a loss of $61 million, compared with a $10.36 million loss a year earlier.

Jim Balderston, an analyst at Zona Research Inc. in Redwood City, said the combination of acquisitions and losses offer hints about where Amazon is likely headed. "It's all related to gathering lots of information about customers," he said. "Amazon may lose money gathering consumer data, but they could make a hell of a lot selling data about online shopping behavior."

Scott Appleby, an analyst at ABN Amro Inc. in New York, agreed that Amazon is transforming itself from a simple product merchant to an information merchant. "It's a logical step for them," Appleby said. Even if consumers balk at having individual information released, Amazon's aggregate shopping behavior data would still be quite valuable, he added.

Amazon, which didn't return calls last week seeking comment, has more than 8.4 million registered users. Information about them could be combined with customer data from two sites — drugstore.com and pets.com — in which it has invested.

Amazon's privacy policy states that it does "not sell, trade or rent personal information to others," but notes it "may choose to do so in the future with trustworthy third parties" while allowing users to decline to have any of their personal information distributed.

JUST THE FACTS

Appendices For Amazon

A sampling of Amazon.com's nonbook holdings:

Accept.com Inc.: E-commerce online transaction technology

Alexa Internet: Web browser add-on that provides information about visited sites

Internet Movie Database: Online movie compendium

Planetall: Web-based address book, calendar and reminder service

Amazon.com Auctions: Online auction house

"The real business [for Amazon] is gathering information," Balderston explained. "They could quickly and easily leverage what they're doing now to become a market leader in online shopping profiles." ◗

Toys R Us Online Plan May Undermine Storefront Sales

Without differentiation, retailer faces friction between Web, real-world stores

BY STACY COLLETT

The $80 million plan to invade the online toy market announced last week by Toys R Us Inc. promises to give its smaller online competitors a run for their money.

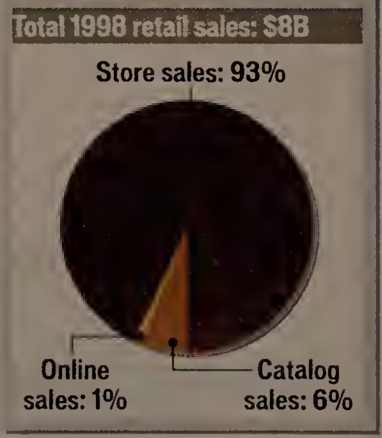
But industry observers said the plan will further erode the retailer's brick-and-mortar business and create friction between its online and storefront entities.

Paramus, N.J.-based Toys R Us announced last week that it has made Toysrus.com a separate subsidiary based in California's Silicon Valley, that it acquired a 500,000-square-foot distribution center in Memphis and that it forged a strategic partnership with venture capital firm Benchmark Capital in Menlo Park, Calif. Benchmark will invest more than $10 million in the site.

Analysts said the plan is underformed; Toys R Us officials were unavailable for comment.

Online Sales

Web selling still makes up a small piece of the retail pie:



SOURCE: NATIONAL RETAIL FEDERATION, WASHINGTON

In a statement, officials said the new site, which will be launched in this year's second quarter, "will offer numerous customer-focused enhancements."

"They must find some package of services that is better than what's in the store," said Brian Hume, president of Martec International Inc., a retail consultancy in Atlanta. Providing product information online can encourage customers to make immediate purchases at the store, he said.

The $11.2 billion retailer fell to No. 2 in the toy-selling market behind Wal-Mart Stores Inc. last year, posting a net loss of $132 million. It's also feeling the heat from small-but-powerful online retailers like eToys Inc., which scored $23.9 million in sales last year.

"It's a two-edged sword," said Chunka Mui, author of the e-commerce guide, *Unleashing the Killer App*. "The market share for their stores is going to go down because competitors like eToys will take away shares, or they'll take it away themselves. The physical stores are in trouble either way."

Toysrus.com must grow separately from the rest of the company while maintaining its brand name and market-leader status, as have the Web-based divisions of Charles Schwab & Co. and Barnes & Noble Inc., analysts said.

Mui said Toy R Us is pitting its brick-and-mortar stores against the online business. "At some point, the people at the stores will say, 'Why are you taking business away?' Most big companies can't get out of their own way [online]," he said. ◗

Ford Will Use Net To Sell Used Parts

BY BOB WALLACE

Ford Motor Co. plans to use the Internet to rev up its entry in the lucrative market for used car parts. Company officials last week estimated the overall vehicle recycling effort could eventually generate $1 billion in new revenue while also cutting costs.

The new Ford unit's plan is to provide a way to sell used parts from junkyards principally to body shops, insurance companies and retailers. It will also recycle materials such as plastics and metals to save on making new parts.

Ford is the first of the major automakers to announce plans to use the Internet to drive into this market, although archrival General Motors Corp. is considering it, said Ken Meeks, an analyst at A. T. Kearney Inc., an auto industry consultancy in Southfield, Mich.

"I see this as Ford looking at an opportunity and realizing the Internet is a wonderful tool to put customers together with the products they're looking for," said Chris Denove, an analyst at J. D. Power and Associates in Troy, Mich. The plan is the latest of several key Ford business efforts enabled by the Internet. The automaker is prepping a Web-based car shopping service, moving its worldwide vehicle design effort to a virtual private network and using the Net for procuring nonproduction items.

Ford hasn't yet said when it will begin selling used parts over the Internet and claims that it hasn't set its information technology strategy for supporting the undertaking. However, e-commerce experts said the $100,000 to $1 million needed for the online effort is a small price to pay, considering Ford's expected revenue.

"They first have to decide if they want to build the systems, buy off-the-shelf packages or partner with someone," said David Baltaxe, an analyst at Current Analysis Inc., in Sterling, Va.

Ford must also decide if it will support the used parts sales effort over a stand-alone Web site and whether it will link it to the automaker's other sites, said Dennis Driscoll, an analyst at Extraprise Group, a Boston consultancy.

Ford took the first step in March by purchasing an automotive recycling company in Florida. According to a Ford statement, the automaker "plans to expand its presence substantially in the coming months." ◗

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BRIEFS

Lotus Backs Top Exec Accused of Lying

Lotus Development Corp. is supporting its president, Jeffrey Papows, after a critical April 29 story in *The Wall Street Journal*. The article, which quotes customers, military officials and former colleagues, contended that Papows has lied about his personal history and embellished his military record when talking to business prospects.

"No one should expect to see any changes here, and our point of view is that the story is largely concocted of rumor and commentary on rumor," said Bryan Simmons, a Lotus spokesman.

Microsoft Unveils Four Support Plans

Microsoft Corp. has unveiled a slate of support programs that the company said was tailored to four customer categories: users of mission-critical enterprise applications who need on-site support and 24-hour telephone help; enterprise customers who need Microsoft to manage systems support; systems administrators who need access to technical information and support staff; and consumers and home users who need online and over-the-phone information.

Short Takes

MICROSOFT has pledged research plus $1 million in goods and services to the consortium developing the Internet2 backbone (see related story, page 16). . . . Former **NETSCAPE COMMUNICATIONS CORP.** CEO James Barksdale has stepped down from the federal Internet Tax Freedom Commission, making way for a local municipality representative. . . . **NETWORK COMPUTING DEVICES INC.** saw quarterly earnings decline from $30.6 million to $26.4 million since last year – and its loss jump from $489,000 to $2 million – because of substantial declines in network-computer sales. . . . **CISCO SYSTEMS INC.** said it would pay $170 million to buy Amteva Technologies Inc., a Glen Allen, Va., maker of middleware to deliver voice mail, e-mail and fax traffic into an IP-based mailbox.

SAP TO OPEN UP R/3 TO THE WEB

Sapphire rollout planned for e-commerce applications, Java user interface, R/3 links

BY CRAIG STEDMAN

SAP R/3 USERS who want to do business online are itching for the back-office software to become more Internet-friendly — and SAP AG is starting to deliver.

At Sapphire '99, its European user conference this week in Nice, France, SAP is expected to announce plans for rolling out a promised set of e-commerce applications, a Java-based user interface that runs in Web browsers and Internet technology for connecting R/3 to the outside world.

The emphasis on the Internet is a promising sign to companies that are looking to use the Web to open up their R/3 systems to customers and distributors.

Interested Party

AlliedSignal Inc.'s diesel-engine turbocharger division in Torrance, Calif., is one. It's among a handful of users that have installed an SAP Internet server that comes with a built-in set of nearly 100 R/3 transactions simplified for end users who haven't had in-depth training on the software.

Getting SAP's Web-enabled transactions ready for 120 U.S. distributors to use took just two to three weeks of work, said Jeff Smith, the division's CIO. "I was thinking this was going to be big and complicated, like everything else in R/3," Smith said. "But it has actually been a pleasant experience."

At Sapphire, Smith plans to meet with European automakers to discuss possible e-commerce links involving R/3. Automakers account for 90% of the division's sales, "and we'd love to have them logging on to the Internet to find out about orders rather than calling us," he said.

Whirlpool Corp. in Benton Harbor, Mich., is also linking R/3 to the Internet to allow retailers that sell its appliances to place orders online. But senior project manager Bob Briggs said it's not clear if SAP's packaged Web interfaces are up to that task.

"If you use R/3 completely generic, they pretty much have the answer for you," Briggs said. But Whirlpool plans to mix R/3 with non-SAP pricing and tax applications that may need custom interfaces.

AT A GLANCE

SAP R/3 Goes Online

SAP's Web-based applications include these products:

Business-to-Business Procurement: Automates purchases of office supplies and other nonmanufacturing materials (available now)

Internet Application Components: Web-based R/3 transactions designed for customers and other casual users who aren't familiar with R/3

SAP Online Store: Catalog for selling products online: Users check product availability and price-quoting

SAP Employee Self-Service: Intranet application that lets users modify benefits choices and other personnel records online

SAP has quietly developed several e-commerce and intranet applications that are starting to become available (see chart). It also is releasing a Java-based version of R/3's user interface that can be installed on an application server and downloaded in applet form by browser-equipped end users.

Another announcement due at Sapphire is a plan to use Extensible Markup Language technology developed by WebMethods Inc. in Fairfax, Va., to provide Internet links between R/3 systems at different companies, or between R/3 and external Web sites.

SAP has "a lot of the pieces of e-commerce in place," said Josh Greenbaum, an analyst at Enterprise Applications Consulting in Berkeley, Calif. "They've been dabbling in this for a while, and they have quite a bit going on."

R/3 user GATX Capital Corp. is looking at tapping into the Internet to send out invoices or to build e-commerce applications for businesses such as PC leasing. What SAP delivers will be critical because R/3 "is really our core system," said Derek Williamson, vice president of information services at the San Francisco asset-management firm. ▶

Lotus to Link Domino to R/3

In Nice, IBM's Lotus Development Corp. subsidiary plans to announce beefed-up software for tying its Domino application server to corporate systems, along with an interface to SAP R/3 that's meant to free users from writing custom links.

Royal Dutch/Shell Group's Houston-based information technology unit is looking at using the new technology in a Web application for managing customer inventories.

Kay Burns, a development manager at the IT unit, said the Lotus-built SAP Connector would give Shell a real-time interface between Domino and R/3. That would replace the batch link now in the application, which is being used by Shell Chemical Co.

The real-time interface would let users automatically generate product shipment orders in R/3 from Domino, Burns said.

– Craig Stedman

Struggling Baan Loses KLM, More Money

Airline pulls out of development project

BY CRAIG STEDMAN

Baan Co. last week suffered two more blows: another quarterly loss and a decision by KLM Royal Dutch Airlines to pull out of a joint software development project.

KLM and Baan were building a new maintenance application that the airline planned to use in servicing its planes.

But Baan officials acknowledged that the project, which began early last year, turned out to be more complex than expected and was running behind schedule.

A Baan spokesman said KLM eventually decided it was "too big an effort" to continue with the project. KLM officials in the Netherlands couldn't be reached for comment.

As part of a settlement, Netherlands-based Baan is paying KLM $2 million for all rights to the maintenance application. The Dutch vendor plans to continue development on its own and will market the software to other airlines, but it wouldn't disclose a targeted shipment date.

Revenue Drops

Baan's $19 million first-quarter loss — its third straight deficit — was slightly smaller than Wall Street analysts had predicted. But software license revenue dropped 29% in the quarter to $65.2 million, despite the fact that the number of Baan sales nearly doubled year-to-year.

Application rival PeopleSoft Inc. in Pleasanton, Calif., also reported a big drop in its license revenue two weeks ago. Both vendors now get less than 40% of their total revenues from product sales — a mix "that's not a sustainable business model for a software company," said Steve Bonadio, an analyst at Hurwitz Group Inc. in Framingham, Mass.

Like PeopleSoft, Baan is trying to boost sales by branching out into new applications, such as a line of e-commerce packages that it announced last week [CW, April 19].

But those products will take at least six months to kick in, Bonadio said. "This won't be the last struggling quarter for Baan," he said. "It's still trying to pull back from the brink." ▶

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Experts Ponder Remedies If Microsoft Loses Antitrust Case

BY PATRICK THIBODEAU
WASHINGTON

Microsoft Corp. continued its antitrust fight last week by deposing key figures involved in America Online Inc.'s Netscape merger. But several antitrust experts and industry groups on both sides of the case said a verdict against the company seems likely, and attention is shifting to remedies.

But what remedies? Most experts seem to agree that anything less than the breakup of the company or forced licensing of its Windows source code won't restore competition.

"What the government needs to do is get a powerful enough remedy to kick-start the market," said Steven Salop, a law professor at Georgetown University in Washington, at a conference here last Friday organized by consumer advocate Ralph Nader.

"Conduct" remedies would require long-term government oversight, and they won't remove the company's incentive to reconsolidate its power, said Glenn Manishin, a Washington-based attorney. He prepared a Software Information Industry Association paper recommending the creation of "Baby Bills" — smaller companies that would result from the Microsoft breakup.

Breaking Up Hard To Do

But Stan Lebowitz, a professor at the University of Texas in Dallas, said a company breakup or forced source-code licensing would raise user costs. Software developers would have to spend more on research and development, as well as support, to develop applications that work with different Windows operating systems. He said he believes Microsoft is being punished for its success.

The Microsoft case, expected to resume in two weeks, has been in recess since the end of February, after both sides concluded their cases.

In the interim, Microsoft has been attempting to show that AOL's $4.2 billion acquisition of Netscape Communications Corp. was deliberately delayed so as not to hurt the government's antitrust case.

Last week, Microsoft attorney Michael Lacovara questioned Peter Currie, the former chief financial officer at Netscape and the first of several executives who played key roles in the merger to be deposed. And Friday, Microsoft began its deposition of Michael Popov, a vice president at Sun Microsystems Inc., which acquired some of Netscape's technology. AOL CEO Steve Case is expected to be deposed this week.

AOL/Netscape merger talks began in late August and were moving rapidly by September, Currie testified. But talks soon took a hiatus that lasted until mid-November. AOL unveiled the merger on Nov. 23. ◗

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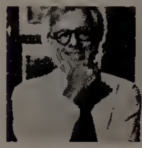
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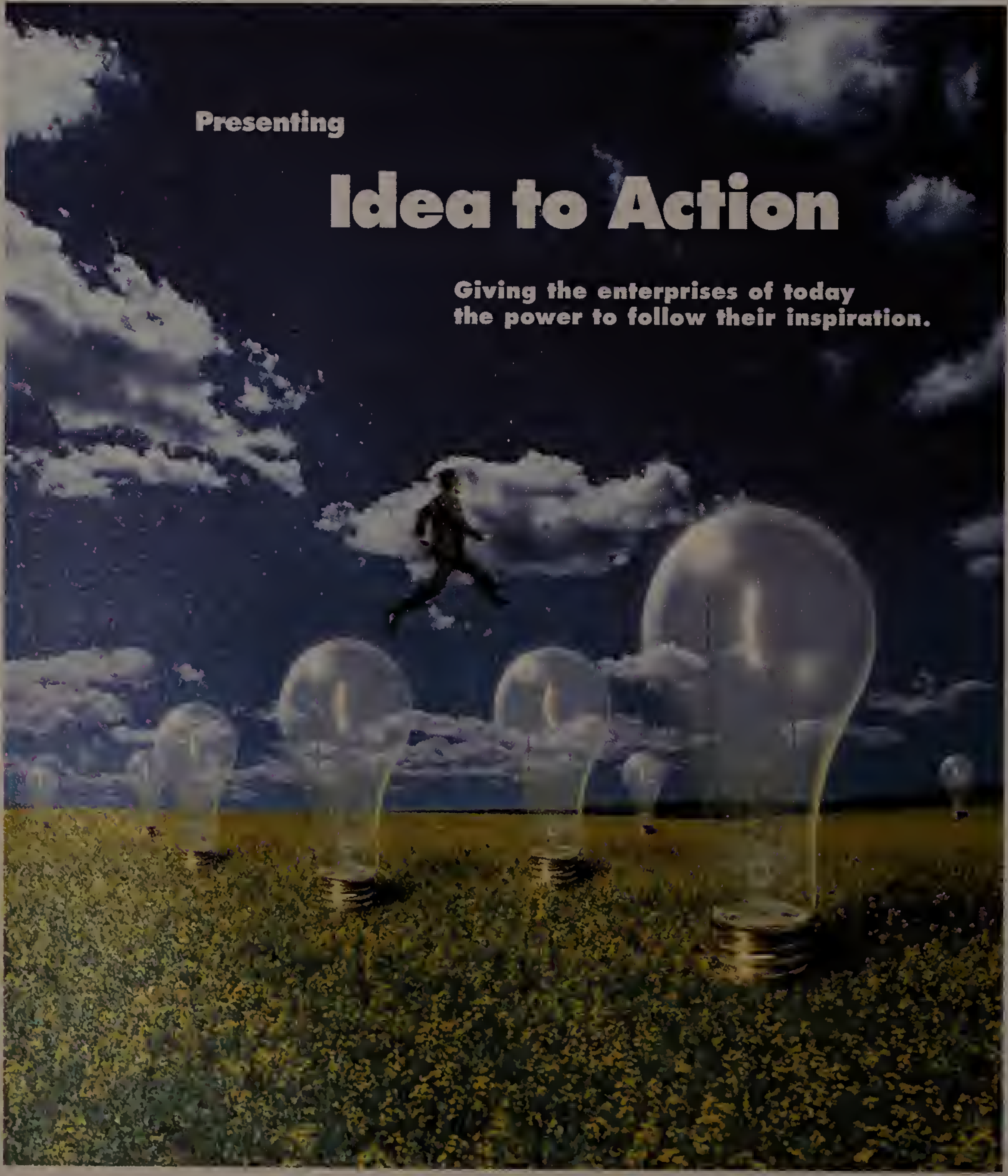
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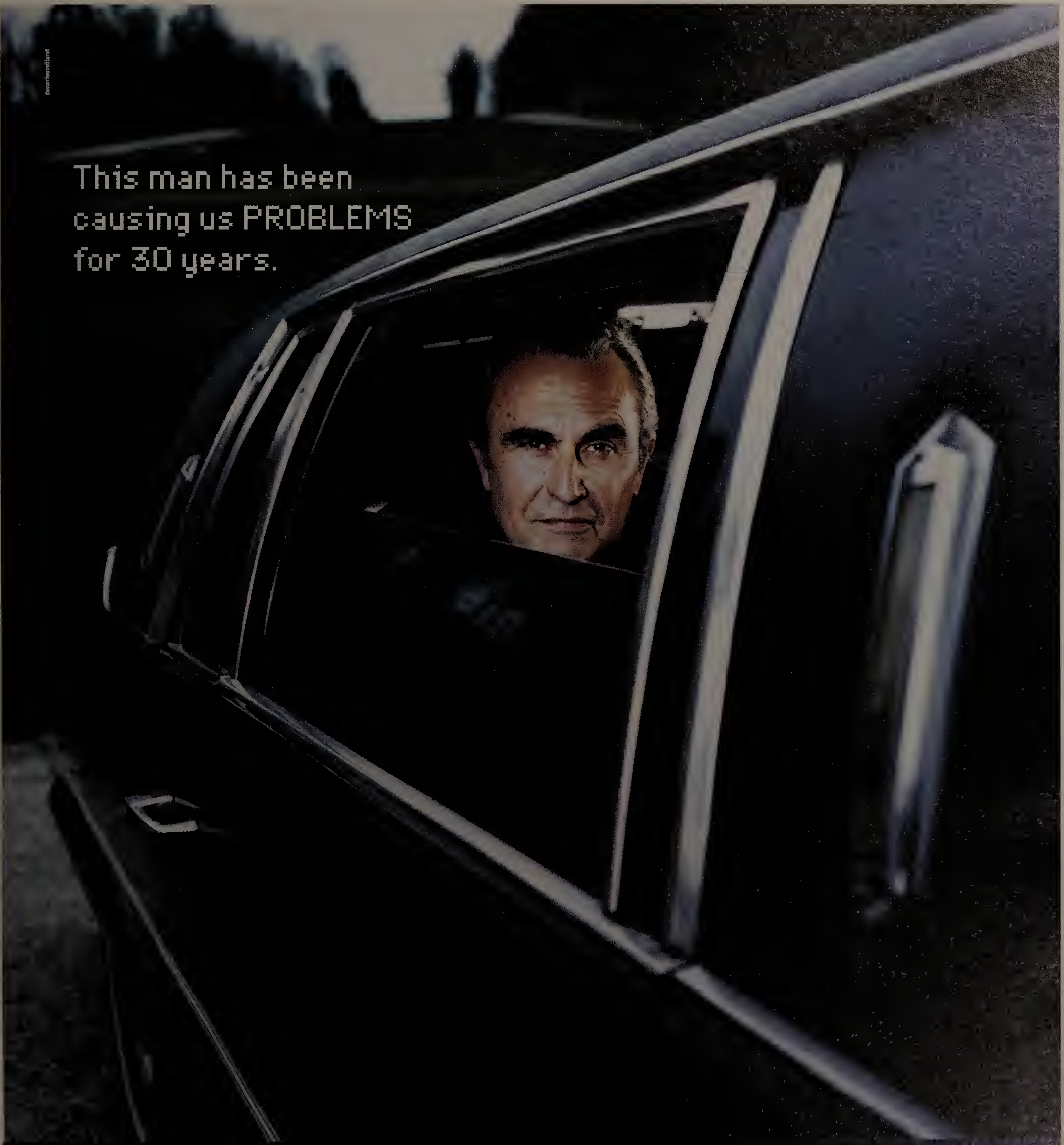

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NETWORKS OF CONFIDENCE Bull

HANDHELDS GET NETWORK CARDS, FASTER DATA ACCESS

Xircom's new CompactCard first to ship, competitive offerings said close behind

BY MATT HAMBLEN

INFORMATION technology manager John Freeman hopes a network interface card for handhelds being announced today will help physicians at Intermountain Health Care Inc. lighten their loads and connect them to patient data 10 times faster.

Currently, about 80 doctors carry laptop computers weighing several pounds each from room to room, connecting through a wireless LAN running at about 1M bit/sec., he said. But the Salt Lake City health care organization is on the list to have doctors beta-test the new CompactCard Ethernet 10 from Xircom Inc. in Thousand Oaks, Calif. It fits inside Windows CE handheld devices and connects through a wired dongle to an Ethernet LAN at speeds of up to 10M bit/sec. Doctors would have to plug the connector in to a connection in each room, but Freeman said he thinks they might like the faster network speeds and the instant-on feature.

Analysts described the Xircom card as the first of its kind but said competitor 3Com Corp. won't be far behind with a similar offering to fit the CompactFlash ports that come standard in most handheld CE models.

XIRCOM's CompactCard fits inside handheld devices

Analyst Fran Firth at Cahners In-Stat Group in Newton, Mass., said the CompactCard will help advance the use of less-expensive handhelds, especially in situations such as health care. If the doctors like the change, they would have handheld computers weighing only 1 to 2 pounds, connecting at faster data rates and at a lower overall cost. Freeman is investigating CE devices from NEC Corp. that have keyboards and sell for about $800. That's well below the $2,800 for the Dell Computer Corp. laptops doctors now use; wireless LAN cards cost an extra $400.

By comparison, the CompactCards are "fairly inexpensive" at $149, Freeman said.

The next step for Xircom will be to equip the CompactCard with wireless capability, something analysts expect next year.

A key feature of the new CompactCard is its ability to conserve power consumption, said Jack Gold at Meta Group Inc. in Westboro, Mass. When not in use, the card automatically shuts off to save battery life.

Analysts said the installed base of Windows CE machines is currently about 1 million in the U.S. but will grow depending on connection options, including wireless. ◗

HotSpot Java Machine Finally Debuts, but Users Question Sun's Performance Claims

System gets limited vendor licensing

BY CAROL SLIWA
PARIS

Sun Microsystems Inc. finally ended a two-year wait for its HotSpot Java virtual machine last week at the Java Enterprise Solutions Symposium here.

Sun launched the technology with claims that it can make Java applications run twice as fast. But potential users need to be cautious, observers warned.

"Until you test it with your own applications, no numbers mean anything," said Jeffry Borror, director of information technology at Daiwa Securities America Inc. One HotSpot endorser touted by Sun — K.wiz Solutions Inc. in Boston — claimed performance improvements of 2.8 times in its software tool, which is used to help predict Web visitors' behavior based on their usage history. The 3-year-old company, however, admittedly doesn't have a substantial customer base yet.

For Hewlett-Packard Co., HotSpot "ensures a significant boost in server-side Java technology runtime performance," said Patrick Rogers, marketing manager at HP.

But a week ago, HP's enterprise Java program manager, Susan Henson, indicated that HotSpot hadn't lived up to initial expectations. "We were led to believe that [the performance boost] would be something huge," she said. "We've seen some improvement of 20%, 30%, 40% — which in a Java environment is not to be ignored," Henson said. She added though that it isn't "absolutely astonishing" either, based on Sun's early claims.

STEVE BORNS

JEFFRY BORROR of Daiwa Securities is wary of Sun's claims

And only a handful of vendors — including HP and Seagate Software Inc. — actually had licensed the technology through last week, a Sun executive acknowledged. For its part, Sun reversed direction at the eleventh hour and elected not to charge for the technology, after telling partners and press just a week before that it planned to impose a fee.

Sun also immediately began talking up HotSpot Version 2. A beta version, which promises further performance improvements, is due in July. ◗

Sun Offers Secure Remote Access Over the Internet

BY CAROL SLIWA

Sun Microsystems Inc. last week launched a server software product that can help remote employees securely access network-based files and applications through the Internet rather than through special dial-up connections.

Users will be able to access their e-mail, calendars and other applications through any PC, network computer or kiosk, as long as it has a Java-enabled Web browser. A Java network applet — called a Netlet — downloads to the local machine from the server to create a secure pipe. It then funnels requests to the server, a company spokesman said.

Sun's i-Planet software acts as a gateway, handling user log-in and authentication and providing links to the servers that host applications or store files.

"Instead of having banks of dial-up modems, we would love to be able to use the Internet for access to our private intranet," said Brian Kilcourse, senior vice president of MIS at Longs Drug Stores in Walnut Creek, Calif. But Kilcourse said i-Planet would need to handle security and the emerging IPSec security specification before he would consider it.

To be available next month, i-Planet will cost $10,000 for a 100-user package. It runs only on Solaris. It can access files or applications running on Solaris, Windows NT, MVS, AS/400 or any Unix operating system. ◗

Sun to Finalize Server-Side Java Specs

BY CAROL SLIWA
PARIS

Sun Microsystems Inc. next month plans to finalize critical components of its Java Enterprise Edition specification, a key step to helping server-side Java vendors make their products work together, a company official disclosed.

The specification — a list of elements that server products need — includes Enterprise JavaBeans, Java Server Pages, Servlets, Java Database Connectivity and Java Transaction Services. It's due at the Java One conference in San Francisco next month.

A reference implementation that helps ensure that products pass muster and compatibility test suites that make sure products conform to the specification are expected by year's end, said Java platform group manager Gina Centoni.

They will include new test suites for software vendors to ensure compatibility with the Java platform.

At Java One, Sun is also expected to launch Enterprise JavaBeans 2.0, featuring "entity beans" — components that developers have requested to help them build server-side applications.

Sun's other focus for the rest of the year will be on a Java 2 platform upgrade, code-named Kestrel, that fixes bugs, tunes performance, makes minor optimizations in the virtual machine and changes a few application programming interfaces, Centoni said.

Work isn't expected to start on the next major release of the Java platform until 2000, she said. ◗

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BRIEFS

Faster Handheld Processor Due

Intel Corp. this week plans to unveil its next-generation StrongARM processor to enable handheld computers and smart phones. The processor is due by June 2000 and should triple the performance and double the battery life of the current StrongARM 1100 processor announced in March. The planned processor will run at 150 MHz using 0.75V and at 600 MHz using 1.3V.

Microsoft Continues E-Commerce Push

Microsoft Corp., which is developing a "one-stop" program to offer software, services and support to implement e-commerce projects, last week unveiled an e-commerce alliance with Baan Co., Ernst & Young LLP and J. D. Edwards & Co.

Web Hotel Bookings To Hit $1 Billion Plus

Internet-based hotel sales will more than double to $1.1 billion this year and reach almost $4 billion by 2001, according to a new study by PhoCusWright Inc. in Sherman, Conn. In three years, the Net will represent 5.5% of all hotel bookings, the survey predicted.

Short Takes

MCI WORLDCOM INC. has posted $709 million in net income for the quarter, up from $186 million for last year's quarter. Revenue was $8.3 billion, up from $2.3 billion a year ago. . . . **CONTROL DATA SYSTEMS INC.** will add management of Microsoft Exchange and Notes/Domino messaging networks to its e-mail outsourcing service offerings. . . . **SOFTWARE.COM INC.** last week acquired **MOBILITY. NET**, a maker of Web-based applications that include e-mail, an address book and task manager. . . . **SOFTWARE PRODUCTIVITY RESEARCH** this week will introduce a Y2K validation service to help companies check whether mission-critical applications will meet the year-end deadline. . . . **SAP AG** released a preconfigured bundle of its R/3 applications for use by high-tech equipment makers.

RETAILERS FEAR IMPACT OF OTHERS' Y2K WOES

Glitches in the transportation industry could affect delivery of imported goods

BY DAVID ORENSTEIN

U.S. RETAILERS are at the end of a complex, global supply chain whose year 2000 readiness is hard to assess. But if there's a weak Y2K link, it could be in the transportation and shipping of goods to stores.

Retailers are concerned that if some transportation companies experience problems, others won't have enough capacity to handle the extra load. Such a difficult shift occurred during the United Parcel Service of America Inc. employees' strike in 1997.

In an April 16 report on contingency planning, the National Retail Federation's (NRF) Y2K survival committee concluded that competitors of disabled freight companies are likely to apply surcharges to pick up the slack. And in March, a Gartner Group Inc. analyst told a U.S. Senate committee that air, ocean and rail shipping companies worldwide are among the relative laggards in Y2K-preparedness.

To investigate the preparedness of shippers, the NRF met in New York recently with two package- and freight-shipping companies, several retailers said. But the shipping representatives offered little useful detail in their presentations and weren't able to answer questions.

The NRF report also laid out dozens of potential crises that could arise if local government or utility systems fail. Several retailers said last week that they don't expect major problems but that they have had to work diligently to wring useful compliance information out of suppliers, shippers, utilities and local governments.

"There is a confident mood among retailers about themselves," said Cathy Hotka, vice president of information technology at the Washington-based NRF. "There is not a confident mood among retailers about others along their very long supply chain."

Importance of Imports

The retail industry is right to take extra precautions, said Jim Duggan, a Gartner Group analyst in Stamford, Conn. "Retailers have a lot of small companies in their supply chain," he said. Many retailers and their suppliers depend on imported goods from nations that may be too far behind in their Y2K work to catch up.

Sometimes frustrated by boilerplate responses from the tens of thousands of firms each large retailer must query, retailers have been paying live visits to key suppliers, utilities and government officials.

The results of those face-to-face meetings have generally been comforting. "We're never going to be 100% comfortable," said Ron Kerr, senior information systems manager at The Home Depot Inc. in Atlanta. But members of the company's Y2K team have quizzed various utility companies with some success. "We're getting good answers, but we've got to do contingency planning," Kerr said.

Not all the news is ominous. Dodgeville, Wis.-based catalog retailer Lands' End Inc., which imports half its merchandise, relies on reports from employees visiting overseas suppliers, as well as reports from Gartner Group. The information the company gathers isn't exhaustive, but "we've been getting more and more comfortable," said year 2000 manager Kurt Van Dynevan. ◗

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Sun Rethinks Java Standards Bid

Frustrated that the International Organization of Standardization (ISO) wants control of the Java language's brand and maintenance, Sun Microsystems Inc. said Friday that it has begun looking to other standards bodies.

"It might be [the European Computer Manufacturers Association], or it also might still be ISO," said Sun spokeswoman Darcy Harrison. She commented Friday after a conference call with Sun President Alan Baratz and George Paolini, vice president of marketing at the JavaSoft division.

Sun has been trying for al least two years to win ISO approval of a Java standard, but it has refused to cede any control of the language. Anne Thomas, an analyst at Patricia Seybold Group in Boston, said, "[ISO] really wants this to be an open process."

Sun, of course, could decide that a Java standard isn't needed.

"I think it is a de facto standard already," said Aaron Yu, a consultant at Proxicom Inc. working for Nationsbanc Montgomery Securities Inc. in San Francisco. "It's so entrenched now that it's not an issue."

– David Orenstein and Sharon Gaudin

Schwab Improves Its Web-Site Navigation

Changes result from tests with 500-plus users

BY THOMAS HOFFMAN

Charles Schwab & Co. last week enhanced its Web site as part of its continuing effort to become more of a full-service investment bank. Schwab said it expects the new site to dramatically improve navigation and thereby help customers invest more money.

To plan the new features, Schwab conducted six months of Web-site usability tests with more than 500 customers, an unusual move among online trading firms.

The latest developments from San Francisco-based Schwab include several new navigation tools aimed at helping customers make investment decisions. One feature, called QuickLinks, will show investors how many shares they already own in a particular stock.

Automated Planning

Schwab also added a retirement planner that lets customers calculate the holdings of their non-Schwab retirement accounts along with their Schwab investments to determine if their retirement goals are on track. For example, if a couple is $400,000 short of their goal, the planner will calculate whether they can make up the difference by working, say, an extra two years or by investing an additional 5% of their salaries.

Improving the user interface is little understood but extremely important in the online channel, said Bill Doyle, an analyst at Forrester Research Inc. in Cambridge, Mass.

"Few [online trading] firms run usability tests. Schwab did, and that's real smart," he said.

That customer-centric approach helps explain why Schwab held a commanding, 27.4% share of the U.S. online trading market as of Dec. 31, 1998, compared with the 12.4% share of its nearest rival, New York-based Waterhouse Securities, according to Credit Suisse First Boston Corp. in San Francisco.

Schwab's customers will have the option of using the original Web site or the new one for an undetermined period of time, depending on customer reaction, said Randy Goldman, a vice president at the company. Both can be accessed at *www.schwab.com.* ◗

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Interface to Monitor Apps Proposed

BY DAVID ORENSTEIN

J. P. Morgan & Co. and Computer Associates International Inc. last week proposed an interface that lets administrators monitor applications based on their business impact. They asked The Open Group LLC, a standards organization in Reading, England, to adopt it as a standard.

The proposed application management interface would let developers define which applications systems and data sources are part of a particular business process.

It would also let them present that information to systems management frameworks such as CA's Unicenter TNG. The technological elements could then be ranked and managed based on the processes they support.

Application interfaces are often vague, but the interface from Islandia, N.Y.-based CA and New York-based J. P. Morgan is a good step toward bringing information technology and its business customers closer together, according to Colin Mahony, an analyst at The Yankee Group, a research firm in Boston. ◗

BUSINESS BENEFITS SEEN IN INTERNET2

High-quality video, audio links, traffic management all key

BY PATRICK THIBODEAU
WASHINGTON

For James Wall, a researcher at Texas A&M University, Internet2 has already paid off: He saves $1,000 per hour in satellite link fees to test an intelligent communications manager used in trauma care.

The technology links an ambulance by video to an emergency room so a physician can direct care remotely. If the high-speed satellite link were to fail, an intelligent communications manager would switch seamlessly to a radio or cellular connection, while orderly degrading service to match bandwidth.

Such a system could eventually help companies that need medical communications links to remote locations.

Although Internet2 is now mostly used by universities, organizers hope high-speed networking technologies being developed for it will improve the Internet, or Internet1. Corporate users could benefit, for instance, if technologies are deployed that could ensure high-quality video and audio links across the Internet.

Floods of Bandwidth

Internet2 is perfect for what Wall is trying to test, because it gushes bandwidth. About 150 universities and 50 corporate partners have been collaborating since 1996 on advanced networking technologies connected by a high-speed Internet network that operates at 2.4G bit/sec.

But for Internet2 application developers, who gathered in Washington last week at the Internet2 member meeting, bandwidth isn't everything.

"We can put out tons of data," said David Jahn, a meteorology researcher at the University of Oklahoma, "but we can't deal with the data."

End-to-end systems — from the network to the workstation — that can control and prioritize traffic are needed to address issues like giving higher priority to video feeds through e-mail. Right now, using Internet2 is "like drinking water from a fire hose," Jahn said.

Today, a corporate video sent via the Net must compete with other kinds of traffic that could degrade it. Part of the Internet2 project is to find smarter and more efficient ways to send bandwidth-intensive traffic over the Internet, said Greg Woods, a spokesman for University Corporation of Internet Development, which is heading the Internet2 project. ◗

JUST THE FACTS

Internet2

- Internet2 was started in 1996 by 34 research universities. Nearly 150 are members today.
- Universities want bandwidth-intensive networks for development of telemedicine, digital libraries and virtual laboratories.
- The goal is to develop new technologies for the global Internet.
- The project costs about $500M.

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Continued from page 1

Feds Probe for H-1B Visa Abuse

allow highly skilled foreign professionals — including IT workers — to hold jobs in the U.S. for up to six years. The increase was widely criticized by U.S. labor groups, which claim that companies favor foreign workers because they are cheaper than their American counterparts.

Companies alleged to have violated the H-1B visa rules could face fines or criminal prosecution or could lose the right to apply for visas for a period of time, according to an INS spokeswoman and immigration attorneys.

The potential, meanwhile, for visa problems to disrupt IT works in progress justifies asking services firms if their employment practices face scrutiny, analysts said.

Founded in 1994, QIS has more than 400 employees at 10 offices in the U.S., Canada, Singapore, India and Great Britain, according to its Web site. The company provides services and consulting in Internet and enterprise resource planning systems development and integration.

Chadwell, the assistant U.S. attorney prosecuting the Surapenini case, said the case isn't related to the quality of QIS's work.

"As far as I know, the work done by QIS was fine," he said. Chadwell said QIS clients face no legal liability related to the proceeding.

There is another risk IT shops need to consider, however. Mark Cecere, an analyst at Giga Information Group Inc. in Cambridge, Mass., said the issue of legality of visas rarely comes up when companies hire outsourcers that rely on foreign labor.

However, he cautioned that companies that outsource their data centers or other large parts of IT should consider this issue going forward.

"It's less of an issue if the outsourcer is playing a supplemental role, because if they drop off the radar, it won't hurt you as much," Cecere added. ◗

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Budget Rent a Car Joins Online Bidding

Customers can pick price they will pay

BY TOM DIEDERICH

Budget Rent a Car Corp. last week announced a new Web-based service that will let customers name their own price for automobile rentals — within limits.

BidBudget (*www.drivebudget.com*), scheduled to roll out this month, was developed in response to "changing consumer travel-purchasing patterns," said Budget spokeswoman Susan Welty. She said the new service taps Budget's existing yield-management and reservation systems.

The site has an area where customers choose a location, select the type of car they want to rent and then name the rate they're willing to pay.

For example, a traveler headed to Dallas looking for a mid-size car could pay $25 each day for a model that regularly rents for $35. "It just needs to be a reasonable bid," she added. "For instance, if the bid was $2, well then . . ."

If the site lets Budget rent even one extra car each day in each city it has an agency, it will have a "very positive financial impact on Budget," said Sandy Miller, Budget's chairman and CEO, in a statement circulated by Budget.

Though similar to the services of Priceline.com, a company that lets users bid on airline tickets, hotel rooms and even home mortgages from multiple vendors, BidBudget is a branded entity that actually provides the products.

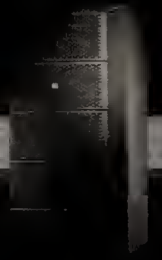
Budget Bomb?

Ron Rappaport, an analyst at Zona Research Inc. in Redwood City, Calif., said BidBudget could end up threatening Budget's existing sales if consumers consistently bid lower prices than Budget normally charges.

"I don't see the value, unless Budget is only going to allow consumers to bid on cars that it otherwise wouldn't rent, Rappaport said. "And if that's the case, it has to be made very clear to the consumer."

"With this service, people who are very price-conscious can have it both ways: They can try and get a cheap deal and not have to go to another rental agency to do it," said Erica Rugullies, an analyst at Giga Information Group Inc. in Cambridge, Mass.

Budget's competitors will almost certainly follow suit, according to Jules Street, a vice president at Killen & Associates in Palo Alto, Calif. And companies like Stamford, Conn.-based Priceline are also likely to join this space with bidding services that encompass several rental car companies, he added. ◗



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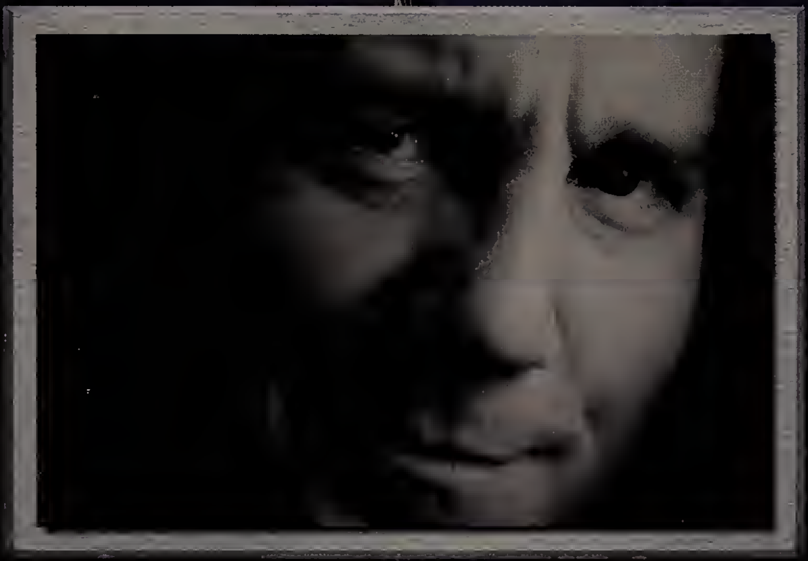

> The next generation clearly leverages both the intranet and Internet as central resources for knowledge. If knowledge is a corporate asset in your organization, Office 2000 could be a very useful tool for creating and managing it... Custom installation is drastically different and much improved...I loved the install-on-demand feature.
>
> **—Andre Kvitka, *InfoWorld*, 8/10/98**

> Microsoft's Office 2000 is more like a platform than a suite of productivity applications. Organizations can choose to integrate third-party applications or customize the platform to suit their own applications and environments. Building on the Office 2000 platform can dramatically improve the overall desktop application management problem for IT.
>
> **—Amy D. Wohl, *Wohl Associates, Inc.*, 3/19/99**

> The next generation of Microsoft's desktop productivity suite goes beyond the desktop, linking workgroups together with Web-based technology—potentially making teamware and low-end groupware products obsolete.
>
> **—Steve Gilmor and Jeff Angus,**
> ***Information Week*, 8/10/98**

> Office 2000 exhibits tighter integration with the Internet, better collaboration tools, and easier installation and migration features than any other office application suite *PC Week Labs* has tested... IT managers will find a lot to like in Microsoft's next release of its office application suite, including the great strides made in features that handle deployment.
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> **—Herb Bethoney, *PC Week Labs*, 8/10/98**

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IT Services Firms Are All Staffed Up, but in Wrong Areas

Some seek to retool ERP for e-commerce

BY BARB COLE-GOMOLSKI

Labor issues continue to vex some of the nation's largest information technology services firms, but the problem isn't a people shortage.

Rather, it's that some of the companies are caught flat-footed with lots of year 2000 and enterprise resource planning (ERP) experts at a time when corporate customers are demanding experts for customer-service, e-commerce and supply-chain projects.

So several IT services firms are trying to retool and retrain their staffs for hotter skills as they work to prevent smaller firms from stealing their business and their people.

JUST THE FACTS

Staffing Woes

Labor issues facing IT services firms include:

- Slowing demand for ERP experts
- A need to retrain workers in hotter Internet technologies
- Increased competition for talent from small firms

Lots of companies have to continuously train IT workers, "but we feel the pressure intensely because IT services is our only business," said Gale Fitzgerald, chairman and CEO of Computer Task Group Inc. in Buffalo, N.Y. The company recently rolled out a program of continuous training for consultants to keep up with market demand for new services.

The staffing woes could make it harder for large services companies to deliver on their commitments and to compete against smaller, more agile firms, said Maria Schafer, an analyst at Meta Group Inc. in Stamford, Conn.

Already there's evidence that IT services giants are feeling pressure from upstarts. Input Inc., a research firm in Vienna, Va., reported April 22 that small firms are taking an increasingly large piece of the outsourcing pie. Though a handful of the biggest players still own more than 50% of the outsourcing market, small vendors are gaining ground in areas such as customer relationship management. "Companies have gotten suspicious that one service provider can deliver best-of-breed services in all areas," said Albert Nekimken, an Input analyst.

To reverse this trend, services giants are busily shoring up their expertise in e-commerce, customer relationship management, data warehousing and supply-chain management, said Tim Bourgeois, an analyst at Kennedy Information LLC, a research firm in Fitzwilliam, N.H.

Time to Retrain

For instance, Cambridge Technology Partners Inc. in Cambridge, Mass., is retraining about 400 ERP specialists to transfer to its e-commerce practice. Others have gone on a buying spree to build up boutique practices in hot areas. Sapient Corp. in Cambridge, Mass., and Boston-based Keane Inc. last month bought smaller services firms that specialize in e-commerce.

Staff retention — holding at around 25% for services firms — also continues to be a problem. Most IT services firms offer competitive pay, bonuses and perks, but observers said some of the best consultants from large firms have recently moved to small firms.

"Most people are looking to work on cool projects, not on commodity services like running somebody's data center," said Wayne Segal, an analyst at Credit Suisse First Boston Corp. in New York. ▶

SOFTWARE LICENSE PLAN MOVES AHEAD

Disputed Article 2B heads to the states

BY KATHLEEN MELYMUKA

AN END RUN by proponents of a change to the Uniform Commercial Code (UCC) may bring controversial software regulations, together known as Article 2B, before state legislatures this fall, leaving user groups opposed to the bill in disarray.

The American Law Institute's (ALI) refusal to endorse the UCC's draft for Article 2B has caused the National Conference of Commissioners on Uniform State Laws (NCCUSL) to try a new tack in its bid to promulgate rules for software sales and licensing agreements.

On April 7, the commissioners' group said it was repackaging the draft as a stand-alone Uniform Computer Information Transactions Act. That move effectively sidesteps the UCC process, enabling it to move the bill without the ALI.

"None of the substance has changed," said John M. McCabe, legislative director for the commissioners' group. "The big difference is that ALI was a partner with the UCC, and isn't in this."

More than two dozen consumer and technology user groups, including the Society for Information Management (SIM), have opposed Article 2B on the grounds that it's biased in favor of technology vendors and against users. Critics said it would remove legal protections that software buyers enjoy but add costs, reduce vendor liability for software defects and force user companies to devote more time and resources to negotiating license terms.

"[The NCCUSL was] apparently being thwarted by the ALI and the vast groundswell of people who felt 2B was not well done. What they couldn't do directly they're trying to do through the back door," said Susan Nycum, a lawyer working on behalf of SIM.

Fast Track

The repackaging changes the timing of the process in ways that worry opponents. As Article 2B, the draft was stalled at least until May of 2000. As a stand-alone measure, it could be approved during the national commissioners' meeting in July and could be introduced in state legislatures this fall.

That could lead to some quick approvals of the article by state legislatures because the draft's supporters are more organized than its opponents, said David Rice, a professor at Roger Williams University in Bristol, R.I., who was one of three ALI representatives on the Article 2B drafting committee.

Even so, losing the institute's participation is a public relations black eye for the NCCUSL. "One would hope that commissioners and state governments might realize that if ALI has reservations about this model law, they should have some qualms about it as well," said Pam Samuelson, a University of California at Berkeley law professor who has been following the process.

The article's opponents are determined to fight back. "More and more companies are finding this unacceptable, and I'm quite sure they'll be resisting it at every level," Nycum said. ▶

Database Deal Aims to Aid Corporate Buyers

SAS, D&B system to track procurement

BY STEWART DECK

SAS Institute Inc. and Dun & Bradstreet Corp. last week announced a partnership to offer systems to track procurement throughout an organization.

Dun & Bradstreet will use its business database to match up a company's list of business names and products; SAS will add its expertise in business intelligence to offer users a consolidated view of the data.

That kind of data may be distributed now through a company in multiple lists. But because most companies don't have a central system of supplier procurement data, they don't have a clear view of all that they're buying, said Larry Barth, a vice president at Dun & Bradstreet.

"Having a consolidated view of procurement will allow companies to make smarter and [more] strategic buying decisions, with some large potential savings," said Katherine Jones, an analyst at Aberdeen Group Inc. in Boston. For example, knowing how often and exactly what's being bought from a single supplier can help companies negotiate better contracts, she said.

The partnership will provide software and consulting services. Dun & Bradstreet will comb through a customer's data sets and assign a specific, numeric identifier code along with detailed background data to each vendor mentioned. It will likewise assign a code for each item purchased.

The SAS data warehousing and decision-support tools will be able to look for commonalities and give users a complete view of what they've bought and from whom through an intelligent desktop client viewer called the Strategic Procurement Manager.

One SAS user said the partnership sounds like a good fit for business-to-business arrangements but won't be of immediate help to him. "We are most concerned about relationships with our consumers" and not with suppliers, said Larry Shaw, vice president of marketing at Vermont Country Store, a catalog retailer based in Manchester, Vt. ▶

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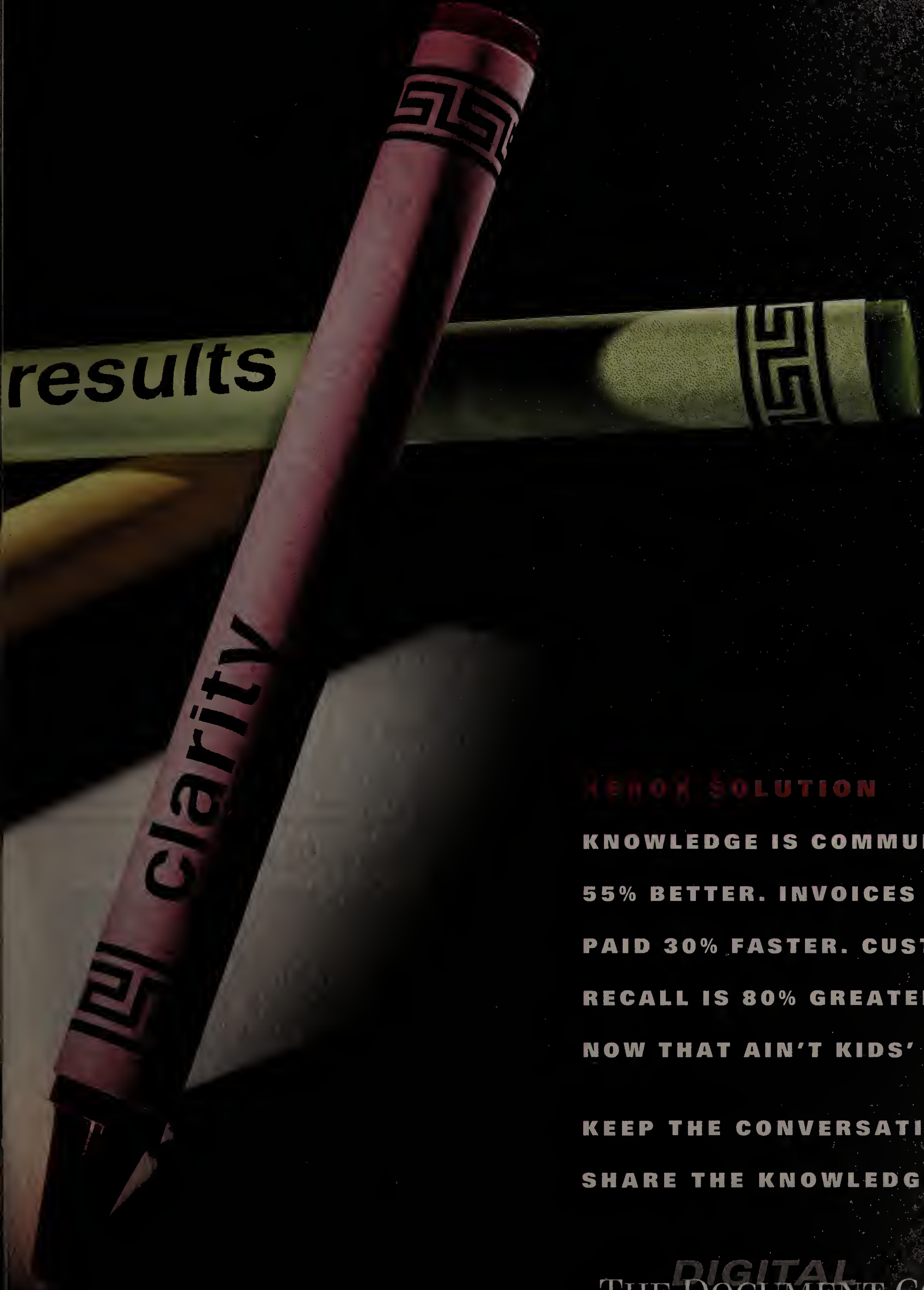

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GANGS NET MILLIONS FROM SOFTWARE PIRACY

California syndicates use global profits for other, sometimes violent crimes

BY KIM S. NASH

IT STRUCK THE WIFE of a Microsoft Corp. employee as odd when she saw it. Why would two small print shops in the Vietnamese-dominated "Little Saigon" section of Westminster, Calif., be pumping out user manuals for Windows 95?

She tipped off Microsoft, whose internal team of ex-cops and lawyers gathered evidence to take to the Westminster Police Department. The police, in turn, discovered the shops were bit players in a much larger, complex network of Asian gangs in Southern California. The crime rings produce and sell counterfeit Microsoft products, then use the multimillion-dollar profits to finance big-time and sometimes violent crimes.

"We work these cases not because we are the Microsoft police," said Marcus Frank, a sergeant on the Westminster force and a specialist in Asian crime syndicates, "but [because] we're cutting off an amazing amount of funding for narcotics, prostitution, extortion — all those things organized crime is commonly known for."

Black-Market Boon

Counterfeiters can make Windows 98 for about $10 and sell it for $55 to $70, a sharp discount from the $90 street price for the legitimate product. Along with the CDs and disks, the criminal groups systematically reproduce Microsoft-like cardboard boxes, warranty cards, end-user license agreements and even the foil hologram that Microsoft uses to mark products as authentic.

"Millions of dollars move," said Annmarie Levins, a Microsoft lawyer leading prosecution of some of the worst cases.

In the print-shop case, the Westminster police and the U.S. Customs Service arrested 15 men and seized an industrial printing press, a shrink-wrap machine and crate upon crate of illegitimate Windows 95 documentation.

That bust eventually led police to a web of criminal operations in Southern California, stretching from Los Angeles south to Westminster and west to Diamond Bar. Investigations are ongoing.

> It's not uncommon to find two groups who are mortal enemies, shooting each other, also cooperating.
>
> MARCUS FRANK, SERGEANT, SPECIALIST IN ASIAN CRIME SYNDICATES, WESTMINSTER (CALIF.) POLICE DEPARTMENT

LARRY GOODE

At the top of the food chain, Frank explained, are the money men, most likely from China and Taiwan, who finance the CD makers in California. The producers then engage middlemen to find printers. They, in turn, subcontract various pieces of work — such as licenses and registration cards — to smaller shops. When all the components are ready, the middlemen collect them and find someone to shrink-wrap and assemble them.

Area police departments don't have it all figured out yet, but various investigations have provided glimpses of the operation. A bust in Monterey Park turned up $6 million worth of fake Microsoft products and $3 million in cash. In a Rowland Heights case, police went in looking for software and also found a large cache of guns and explosives. Ming Ching Jin later pleaded guilty to software piracy, money laundering, possession of illegal explosives and kidnapping.

Intense police activity has now shifted to Paramount, a sunny suburb south of Los Angeles. Since last fall, more than $56 million worth of fake Microsoft products have been recovered.

After a February raid on 11 warehouses and cars, three men were arrested — including a midlevel leader, Hemant Navnit Bham. The strike turned up 4 million pieces of fake Microsoft products, plus machines such as replicators and printing presses. Also among the confiscated tools of the trade were 10 stampers, which are dinner-plate size master disks that can each produce 140,000 to 150,000 CDs. It took three days and nights to collect all the evidence.

"It reminds me so much of the war on drugs," said Levins, a former district attorney in New York. Both need large financial backing up front to import and export the goods. Both involve millions of dollars in profits. And more than special skills, both require carefully organized activities to be successful.

Slap on the Wrists

But unlike narcotics cases, software piracy results in scant jail time and relatively small money fines. Though that's gradually changing, and convicted pirates are seeing harsher sentences, the Monterey Park convicts, for example, got just 18 months in jail.

Real punishment comes from convictions for money laundering, when counterfeiters hide money in offshore bank accounts or buy property in the names of relatives, for example. "That will get you 20 years in the federal system per count, as opposed to one to three years," which is typical for software piracy.

Neither Microsoft nor the police know for sure where the expensive production equipment like replicators and stampers comes from. CD stampers are thought to come from China and other parts of Asia, though most replicators are probably built or bought in the U.S., said a key Microsoft investigator and former Los Angeles police officer. She asked that her name not be used.

Once the gear is seized, investigators can pinpoint which CDs were made by which machines, Levins said, though she declined to say how that sleuthing is done. But using that technique, Microsoft has traced shipments of fake CDs to Spain, Portugal and various countries in Asia.

Fake Licenses

A new gang product has emerged during the past six months: fake Microsoft end-user license agreements. It's a simple black-and-white paper that looks like Microsoft's and reads like Microsoft's but is worthless. "Like a fake ticket to a baseball game," Levins said. Microsoft sells the agreements in a box or special envelope, but counterfeiters offer them stand-alone.

Investigating these criminals is getting harder. Undercover buys don't work because the gangs will rarely, if ever, deal with someone they don't know.

The gangs also use countersurveillance tactics. One member will drive around behind a moving van full of counterfeit products to make sure no one is tailing them to the drop-off location. Or the van's driver will duck in and out of quiet streets to see whether anyone is behind him. "They may take an hour to drive one mile," the Microsoft investigator said.

Piracy's big profits have spurred even traditionally unfriendly Asian factions to cooperate, Frank noted. For example, police found that a Laotian gang caught for counterfeit documentation had been hired by a Chinese syndicate.

"It's not uncommon to find two groups who are mortal enemies, shooting each other, also cooperating," Frank said.

"Crime makes them all money, and there's lots of money to be made in software crime." ▶

Fake Software Stacked to the Ceiling

Police in Southern California have found warehouses full of fake Microsoft manuals, packaging and "certificates of authenticity"

Microsoft-authorized ▶ CD makers typically produce 30,000 CDs before servicing a replicator. But counterfeiters often pound out 70,000 or more, which results in faulty discs

Chernobyl Virus Not Even a Cold for Most U.S. Companies

BY ANN HARRISON

U.S. companies just experienced the upside of March's Melissa virus outbreak: Improved virus protection strategies shielded many of them from the fierce Chernobyl virus that detonated last Monday.

Only 2,328 computers in the U.S. were reported to be damaged by the virus, according to the Computer Emergency Response Team (CERT) Coordination Center at Carnegie Mellon University in Pittsburgh. Most of the reported victims were home computer users and university students and faculty, said CERT spokesman Bill Pollak. By contrast, 100,000 computers were infected with the Melissa virus, CERT said.

"The main reason most U.S. business were spared was that the Melissa virus and its notoriety inspired companies to update or actually purchase antivirus software," said Sal Viveros, marketing manager at Network Associates Inc. in Santa Clara, Calif.

Overseas Outbreak

But the Chernobyl virus damaged at least 700,000 computers in the Middle East and Asia. In South Korea, the virus infected over 250,000 computers. The virus also damaged about 100,000 PCs in China and 300,000 in Turkey, government officials said.

Because foreign companies were uninformed about the Melissa virus, Viveros said, they failed to take defensive measures. The widespread use of pirated software in Asia — which encouraged the exchange of infected executable files — contributed to the spread of the Chernobyl virus there, he said.

Also known as CIH 1.2, the virus was created last year in Taiwan and infects computers running Windows 95 and 98. It deletes data on a computer's hard drive and attempts to overwrite and destroy a PC's flash BIOS, which is needed to boot the computer. The virus is known as Chernobyl because it was set to activate on the 13th anniversary of the Chernobyl nuclear disaster.

Steve Trilling, director of research at Symantec Corp.'s Anti-Virus Research Center in Santa Monica, Calif., said that in most cases of Chernobyl infection, the first megabyte of the host hard drive was overwritten, wiping out the master boot record and requiring the disk to be reformatted. If the virus also damaged the flash BIOS, the motherboard would have to be replaced, he said.

Those who didn't run an infected program last Monday didn't have any data erased. But Trilling cautioned that they may still have infected programs — and that the virus is set to trigger again on June 26. ◆

MORE THIS ISSUE
For *Computerworld* columnist Frank Hayes' take on the Chernobyl virus, **see page 98.**

We don't make this stuff up.

Company's controller says she stole millions from firm

RICHMOND, Va. — The controller of a computer consultant firm has acknowledged she is guilty of stealing between $8 million and $12 million from her employer, her lawyer said.

Prosecutors allege that Mary Adams Collins, 31, stole the money from Halifax Technology Services Inc. to purchase real estate, jewelry and automobiles. She was charged Thursday with federal bank fraud and money laundering.

Collins has signed a plea agreement admitting guilt and saying she will make full restitution, said her attorney, Thomas Wolf.

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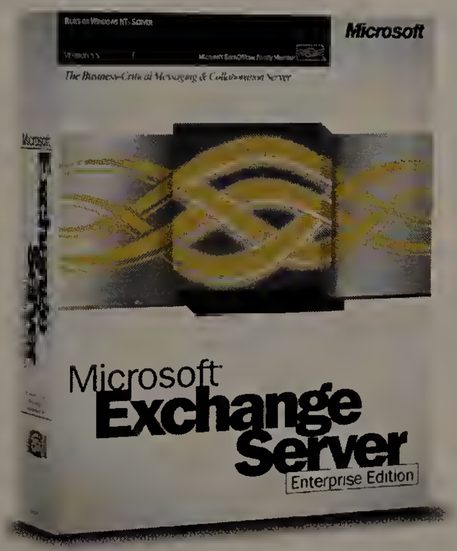

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BRIEFS

Compaq to Resume Presario Sales Online

Compaq Computer Corp. last week released guidelines that Internet distributors must follow to sell the company's Presario consumer PCs online and said it will soon re-establish that sales channel, which it halted in February. Requirements for online resellers include a Web site where only new Presarios are sold, regular telephone customer support hours and e-mail customer support.

AT&T, Japanese Telco Target Corporate Nets

AT&T Corp. and Japan's Nippon Telegraph and Telephone Corp. (NTTC) last week signed an agreement to jointly sell network-related services to multinational companies. The world's two largest telecommunications companies, AT&T and NTTC will offer services for designing, building and managing networks for large corporate customers.

Dell Adds Online Store For Latin America

Dell Computer Corp. last week launched an online store for Latin-American customers *(www.dell.com/la/)*. Dell officials said the move was prompted by the region's "tremendous dynamism" involving the Internet. The company said it plans to open a Portuguese language store specifically for Brazil before year's end.

Short Takes

ORACLE CORP. said it will acquire Netherlands-based mobile software vendor **TINOWAY INTERNATIONAL B.V.** Terms weren't announced. . . . **INTEL CORP.** CEO Craig Barrett said about half of Intel's venture capital investments next year will go to companies in Europe, Latin America and Asia. This year, more than 80% will go to U.S. companies. . . . Britain's **GENERAL ELECTRIC CO.** last week agreed to purchase Pittsburgh-based **FORE SYSTEMS INC.**, a vendor of Internet switching equipment, in a $4.5 billion cash deal.

HP TO OFFER 'E-SERVICES' TO INTERNET PROVIDERS

Risk- and revenue-sharing model is part of e-commerce strategy

BY JAIKUMAR VIJAYAN

Hewlett-Packard Co. last week announced it will provide — at no initial charge — technology and service bundles to Internet service providers so they can offer e-commerce services to small and midsize companies.

A key aspect of HP's strategy is a new risk-sharing business model: In return for a portion of future service-related revenue, HP will help Internet service providers deploy, support and co-market the e-commerce services, without their having to pay hardware or software costs upfront.

HP's approach should reduce any risks that providers face in hosting e-commerce services. It also will make e-commerce options, such as electronic storefronts and online credit-card processing, more available and affordable for small and medium-size businesses, said Nina Lytton, president of Open Systems Advisors, a consultancy in Boston.

"Large companies have a lot of options. . . . It is the smaller ones that need something sophisticated and moderately priced," she said.

Helping HP deliver the preconfigured hardware, software and integration services will be a team of vendors that so far includes the following:

- ■ Breakthrough Software Inc. in San Jose, which provides ShopZone software for building online stores.
- ■ ClearCommerce Corp. in Austin, Texas, which offers payment processing software.
- ■ Cisco Systems Inc. in San Jose, which provides router technology.

HP's E-Services initiative marks an important phase of its unfolding Web strategy, said Thomas Kucharvy, president of Summit Strategies Inc. in Boston. Not only will HP deliver the infrastructure technologies — hardware, software and middleware — needed for e-commerce applications, but it will also increasingly seek revenue from application hosting and shared-risk ventures with its customers, he said.

An example of this strategy is HP's purchase last October of Open Skies Inc., a vendor of airline reservation system software. Small and medium-size airlines will pay HP a few cents for every ticket sold, in exchange for HP hosting the airline reservation system.

A major component of the strategy will be to partner with or buy companies that will help HP deliver such technologies and services, said Nigel Ball, general manager of HP's E-Services division.

Just last week, for instance, HP announced it's investing $35 million in a partnership with BroadVision Inc. in Redwood City, Calif. The two companies will develop software that help companies build corporate Web portals. ◗

SNAPSHOT

Quarterly Earnings Report

	REVENUE		NET INCOME (LOSS)*	
COMPANY	Q1 1999	Q1 1998	Q1 1999	Q1 1998
Amazon.com	$293.64M	$87.36M	($61.67M)	($10.37M)
America Online	$1.3B	$275M	$117M	$39M
AT&T	$14.1B	$12.8B	$149M	$706M
Baan	$175.77M	$179.48M	($19.08M)	$2.14M
CA**	$1.63B***	$1.47B	NA	NA
Nortel Networks	$4.42B	$3.51B	($470M)	($32M)
Qualcomm	$932.4M	$760.55M	$65.24M	$18.62M
Versant	$6.2M	$4.6M	($1.4M)	($5.9M)

*Refers to calendar first quarter, results reported last week. **Computer Associates ***Projected

Celeron Machines Draw Corporate Interest

Intel budget chip aimed at consumers, but IT bargain-hunters may bite, too

BY MATT HAMBLEN

Intel Corp. last week unveiled its latest Celeron processor and a chip set aimed at low-cost PCs.

Although they will appeal mainly to consumers and small businesses, Celeron-based machines could also interest some midsize businesses and corporations that neither need nor care for the higher-priced Pentium III systems.

Rob Enderle, an analyst at Giga Information Group Inc. in Santa Clara, Calif., said that the new Celeron 466-MHz processor and new 810 chip set will make $500 to $1,000 PCs "real for corporations, not just consumers."

Enderle said Fortune 500 companies are "looking for value when making purchases," and Intel's Pentium III isn't considered a value. "Right now, the Celeron provides more than enough performance the market is requesting," he said.

Several PC makers, including IBM, announced they will adopt the Intel products. IBM expects to sell many Celeron 466s inside its IBM PC 300GL line for large corporate customers, said Greg Ross, IBM product manager.

Celeron machines appealed to Suburban Plastics Co. in Elgin, Ill., a plastics maker with 225 employees. The company bought 20 Gateway PCs — with Celeron 333-MHz processors — at $1,000 apiece a year ago.

"Value was a big part of it, since speed and Pentium performance was not critical for us," said Dennis McElroy, systems administrator. Many corporate users have said they don't see the value of the 500-MHz Pentium III [CW, March 22].

"We have had no regrets and no problems using Celerons" because the PCs are used for database access and word processing, but not for Web browsing or graphics, McElroy said. He said he wouldn't hesitate to buy Celeron machines again.

Analysts said Intel has created a conflict by producing both higher-priced Pentium III chips, now with 500-MHz processing speeds, and the less expensive Celerons.

"Intel's conflict is that they don't want to be too successful at the low end and take away from the high-end business. But they don't want to lose out to competitors at the low end" such as Advanced Micro Devices Inc., said Roger Kay, an analyst at International Data Corp. in Framingham, Mass. ◗

Price Comparison

April prices of single Intel processors (in orders of 1,000):

PROCESSOR	PRICE
Celeron 466 MHz	$169
Pentium II 450 MHz	$396
Pentium III 450 MHz	$411
Pentium III 500 MHz	$637

SOURCE: INTEL CORP.

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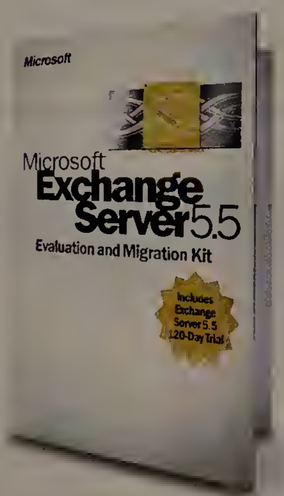
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PAUL GILLIN

Privacy politics

IT'S DEPRESSING to hear members of Congress describe government regulation of Internet privacy as "inevitable" [CW, April 26]. These are the same people who dreamed up the Communications Decency Act of 1997 — quite possibly the most moronic piece of technology legislation ever passed.

PAUL GILLIN is editor in chief of *Computerworld*. Contact him at paul_gillin@computerworld.com.

But Congress will regulate the Internet if it can. At least five privacy-related pieces of legislation are either pending or are likely to be introduced this year, including one that would create a privacy regulatory agency. Privacy is a shiny bauble to lawmakers. It's a no-lose proposition that lets politicians put a symbolic stick in the eye of business without raising taxes. And who's against privacy, anyway?

Unfortunately, the issue is a slippery slope for Internet merchants because it opens the door for the government to start regulating the way they deal with their customers. Sadly, Web merchants asked for it. Internet businesses have done a lousy job of self-regulating privacy, despite symbolic moves like IBM's bold declaration that it won't advertise on Web sites that don't post privacy policies.

There are two basic problems. One is the rapid growth of the Internet. About 50 million people have come online in the past five years, most knowing nothing about e-commerce. A few scare stories are enough to spook new users into demanding more controls.

But merchants haven't helped matters by taking liberties with their own customers. Think of it: Why should I give someone my fax number and birth date just so I can read a news article? Why should a Web-site operator assume I want to receive junk e-mail unless I choose not to?

Nonetheless, if Congress gets a regulatory foot in the door defending privacy, it could clamp down on other areas of the growing Internet medium. That's why online merchants need to lobby their representatives to reject the privacy initiatives. The market, over time, will weed out those site operators who don't respect their customers. And users will get more savvy with experience.

Creating a federal privacy agency to clamp down on Internet businesses right now is in nobody's best interests — not consumers', not merchants', not even Washington's. ◗

DAN GILLMOR

More diverse Web will present IT a new challenge

AS IF YOUR LIFE wasn't already complicated enough, here comes the widening and thinning of the Internet — and a new set of demands on IT skills. For IT, that change represents a challenge. The end of the one-size-fits-all Web means that pure content becomes even more critical than it was before.

DAN GILLMOR is technology columnist at the *San Jose Mercury News*. Contact him at dgillmor@sjmercury.com.

The Internet is getting wider as high-bandwidth pipes reach beyond businesses and into homes, hotels and, eventually, just about everywhere. It's also getting thinner, however, as a variety of low-bandwidth, Net-enabled wireless devices begin to hit the market.

When your users are plugging into the company from a high-bandwidth pipe at home, they'll want to do everything they can do at the office. And when they're pulling down data on to a cell phone's tiny screen, they'll want only the most basic kinds of information — pure text, for the most part — as opposed to the graphics they often expect on PC screens.

How will IT handle this? One place to focus on will be Extensible Markup Language (XML), which neatly separates content from structure. XML will be essential to any organization that wants to make information available on a variety of devices.

For another thing, don't assume every Web server will handle requests from all devices. You don't expect a pager to send an alert to your PC (though maybe it should). Plan to serve specific devices, in some cases, with dedicated content and servers.

The vendor community is well aware of the problems, naturally, and is working on a variety of products to address them. The basic idea is to let content creators set up one Web site and automatically reformat the data as it's being dished out to various devices, ensuring the best possible display on all of them. Early adopters include Yahoo, which just signed a deal with Online Anywhere — a Motorola-funded start-up in Silicon Valley — for technology that helps deliver content to different devices.

Big companies are into it, too: IBM is testing a system that does much the same kind of thing.

All of that is good news for consumers and workers, who will have more choices in how they deal with information. And yes, IT will find itself facing new tasks and huge new planning issues to create morphable content.

Ultimately, the trend should prove to be good news for companies. Anything that makes their employees and customers happier and more efficient will be good for them, too. ◗

DAVID MOSCHELLA

Companies need to optimize the Web — or else

IF YOUR ORGANIZATION is struggling to incorporate the Web into its traditional business practices, rest assured you're not alone. As the recent turmoil at Compaq indicates, even some of the biggest and best high-tech companies can find the Web difficult to accommodate. Six years into the Internet era, what can we say about how the IT industry is managing to cope with its own creation?

Overall, the impact of the Web on large, pre-Web IT companies can be roughly broken down into three main types of results. Some companies have clearly been helped; others have faced serious, Web-rooted challenges but have successfully dealt with them; still others have been hurt. Let's look at each group and see what we can learn from their experiences.

The first group is the easiest to explain and the happiest. For companies such as Sun, Cisco, Dell, EMC and Oracle, the Internet is like having a strong wind at your back. Clearly, the Web has greatly stimulated customer demand. But perhaps more important, because all of those companies have always sold primarily via direct channels, the Web hasn't created any serious business-model conflicts.

DAVID MOSCHELLA is an author, independent consultant and weekly columnist for *Computerworld.* Contact him at **dmoschella@earthlink.net.**

Those vendors' situations are analogous to mail-order companies such as L. L. Bean or Lands' End, for which the Web is mostly an unmitigated blessing.

A second group consists of companies for which the Web was a potentially serious problem but that have successfully managed to turn it into a major opportunity. Included in this list would be Microsoft, Novell, IBM and its Lotus unit.

Regardless of how one feels about Microsoft's business tactics, its rapid reorientation around the Internet has decisively demonstrated that each new computing paradigm doesn't necessarily dictate a change in supplier leadership.

Like Microsoft, both Novell and Lotus had to update their products in order to support Internet standards and pursue various Web opportunities. Novell has risen from its near-death experience and is on the verge of once again becoming a high-flying network software company.

With Domino, Lotus quickly and simply did what many had said was impossible: It integrated Notes and the Web into a largely seamless capability.

Finally, IBM has used its marketing and service prowess to position itself as a real leader in e-commerce offerings and systems integration. In short, all four companies are examples of businesses that needed to make real changes and did.

> Because the wind can't be at everyone's back, many companies will either have to change or suffer.

Our third group consists of those companies that, although still generally successful, are clearly struggling to find a home within the Internet community. Chief among those is Compaq, but my list would also include Hewlett-Packard, EDS, many of the telecommunications companies, and, previously, Digital.

Of those, Compaq and HP are the most instructive. Compaq appears willing to do just about anything other than accept the fundamental superiority of the direct-sales model. HP faces similar PC channel challenges, but it's also searching for a larger, IBM-like, Internet story.

Following the strong precedent of IBM, AT&T and EDS, both Compaq and HP are seeking new CEOs from well outside their own ranks, a clear admission that the desired changes haven't been happening fast enough.

In which of those three groups does your business fit? Because the wind can't be at everyone's back, many companies will either have to change or suffer. Here, the lessons of the IT industry are clear. Real change is possible, but not every company can do it quickly enough within its own culture. Strong leadership is essential, at the CEO level and below. ◗

READERS' LETTERS

Taking on the terrors of the terabyte

YOUR FRONT-page article ["Terabyte Headaches," CW, March 22] on managing terabytes of data from a physical sense is quite applicable for many systems, but none more than the growing data warehouses that are seemingly in everyone's plans. I suggest that one company has an interesting solution for this abundance. Query Object Systems (*www.queryobjects.com*) uses mathematics to reduce the size of data warehouses by factors of 100. Companies like MCI are using this with their Informix data warehouses to reduce processing time, storage needs and costs.

I also found it interesting that editorials on the evils of Intel's privacy-reducing serial number in its Pentium III chip appeared in *Computerworld* and every major publication, but the maintenance of huge quantities of data, presumably related to transactions by individuals, seems acceptable. If companies want to invade privacy, all they need to do is buy some lists and do some "joins" between databases. No serial number is needed.

Harry J. Berkley
IT director
W. R. Berkley Corp.
Greenwich, Conn.

Tech Industry stuck in the Middle Ages

THE SO-CALLED labor shortage is of the industry's own making. There is a shortage of people with five years' experience in the hottest skills who are willing to work 80-hour weeks. There should be — they self-destruct.

But there isn't a shortage of people who are hard-working, intelligent and capable in the IT field. The problem is the industry's unwillingness to employ part-time workers, its reluctance to let experienced workers work in new technologies and its narrow focus on employing people based on buzzwords rather than capability.

It's ironic that companies that claim to be establishing a new age of doing business are still stuck in the Middle Ages when it comes to employment practices.

Sheri Dumire-Hamilton
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Melissa aftershock

AS AN ADD-ON to your story about companies being affected by the Melissa virus ["Suspect Arrested as Melissa Virus Mutates," CW, April 5], you should mention the downstream problems generated by sites shutting off their servers. The main problem at Western Carolina University has been that mail is backing up as it waits to be delivered to those sites that are either overwhelmed or turned off.

This adds to the overhead of a mail server by attempting to deliver this backlog of queued mail over and over. Most of our user complaints have been about the long delay of sending and receiving messages that are normally delivered very quickly.

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COMPUTERWORLD welcomes comments from its readers. Letters shouldn't exceed 200 words and should be addressed to Maryfran Johnson, Executive Editor, Computerworld, PO Box 9171, 500 Old Connecticut Path, Framingham, Mass. 01701. Fax: (508) 875-8931; Internet: letters@computerworld.com. Include an address and phone number for immediate verification.

HELEN PUKSZTA

Forget knowledge management; back to information

IT'S TIME WE STOPPED pretending that we can manage knowledge and conceded that the best we can do is what we haven't quite mastered in the first place — manage information.

In simpler times, knowledge and information were customarily interchangeable terms. To have knowledge of changing customer preferences was to have tacit or explicit information that supported it. But then knowledge management experts declaimed lofty distinctions among data, information and knowledge. Never mind that whatever we capture in IT is, ultimately, data. And what qualifies as knowledge in one context is barely information in another. According to my own unscientific survey, few people in business or IT can tell precisely where information ends and knowledge begins. Why is it that, after all these years, we still don't get it? Because most of the proposed distinctions are neither practical nor elucidating.

HELEN PUKSZTA is a consultant in Chicago, specializing in IT strategy and management. Contact her at helenp@flash.net.

The only sound distinction between knowledge and information is that knowledge has an inseparable component: cognition. It's that mental faculty by which we acquire knowledge and without which we just don't *know*. And no matter how much information you extract from experts, present in all the right contexts, and try to make actionable, if I don't get it, it will never be knowledge to me. And if it's presented before I have my coffee, it might not even make it from jumbled data to information.

If you view knowledge as a state of knowing or understanding (alas, I can't claim that definition as my own — Descartes and every dictionary got to it first), "knowledge management" smacks of something like "thought management" — an unappealing concept. We can't manage anyone's ability or willingness to know. And until we come up with a technology that will extract, analyze and synthesize information and then recommend to a business manager what to do, we're not quite managing knowledge — we're still trying to manage information, hoping that it will enhance someone's knowledge and ability to make the right decisions at the right time.

With knowledge processing still largely the domain of humans, we're stuck with mere information processing — and with the perennial need to hire smart people.

Knowledge management experts frequently bemoan the fact that whenever they look closely at corporate knowledge management efforts, what they typically discover is ordinary information management. One might ask: What did they expect to find? A reification of knowledge, perhaps?

If knowledge management is here to stay, I suggest we agree that for us in IT, it's really a variation of good old information management. Sure, this time it's not about traditional accounting, control or even historical data. The focus instead is on facilitating the generation, sharing, acquisition and application of knowledge in an organization. And although IT has a tremendous role to play here, as always, people and processes are just as important.

If labeling an effort as knowledge management helps inspire people to learn from others and share their knowledge, and if it helps a company perceive knowledge as a source of value creation and competitiveness, let's go for it. But I also suggest we leave the distinctions between knowledge and information to experts in epistemology and out of the IT realm. ◗

GOPAL K. KAPUR

Why IT project management is so hard to grasp

THE LATEST INVESTMENT in IT productivity is project management. Will it pay off? Only if IT professionals develop a clear understanding of the principles and practices of disciplined project management *for IT projects*. The bulk of the project-management body of knowledge has been developed by the engineering profession — especially civil engineers.

Many IT organizations are trying to replicate the principles, practices and tools developed by engineers to manage IT (and business) projects. Therein lies the problem.

Based on my experience, first as a civil engineer and now as an IT project management consultant, I strongly believe that there are distinct differences between the two professions. I further believe that IT projects are much more difficult to manage. For a project-management investment to pay off, the engineering project management body of knowledge needs to be adapted and expanded to the specific characteristics of IT projects. Otherwise, the investments in education, training and software tools will come to the same end as most of the other highly touted productivity investments.

GOPAL K. KAPUR is president of the Center for Project Management in San Ramon, Calif. Contact him at gkapur@center4pm.com.

Although there are about two dozen differences, the following seven are key:

1. Clearly defined end state. The end state of a typical engineering project is clearly defined through well-documented artists' renderings, architectural models and engineering drawings before any construction work begins. In the case of IT projects, the converse is true. The end state of IT projects is often not clearly defined, or known, even after the project is completed.

2. Linear project phases. The phases of a construction project (architect, design, specify and build) are linear and their boundaries are well-defined. In the case of IT projects, various phases not only overlap, but they even spiral — making the project-management process extremely complex.

3. Creating vs. fabricating. In the case of engineering projects, the construction process primarily consists of fabricating the end product from predesigned and pretested components. In the case of IT projects, most code is still written from scratch.

4. Deterministic deliverables. Deliverables in most engineering projects are defined in precise terms. For example: "Shaft-wall cavity, 1-in. steel C-H studs with two layers of 5/8-in. gypsum board, a two-hour fire rating." IT deliverables are seldom defined to the same degree of specificity and often remain open to different interpretations by different players.

5. Historical information. In engineering, extensive databases of highly accurate and easily usable effort and cost values are broadly available to estimators. In IT, there are few sources of such information. Most IT estimating consists of team members' best guesses.

6. Well-defined responsibilities. In the case of engineering projects, responsibilities of team members, such as steel fabricators, drywall installers, masons, plumbers and electricians, are quite specific. In IT projects, the same person (time permitting) invariably ends up being the analyst, designer, programmer and tester.

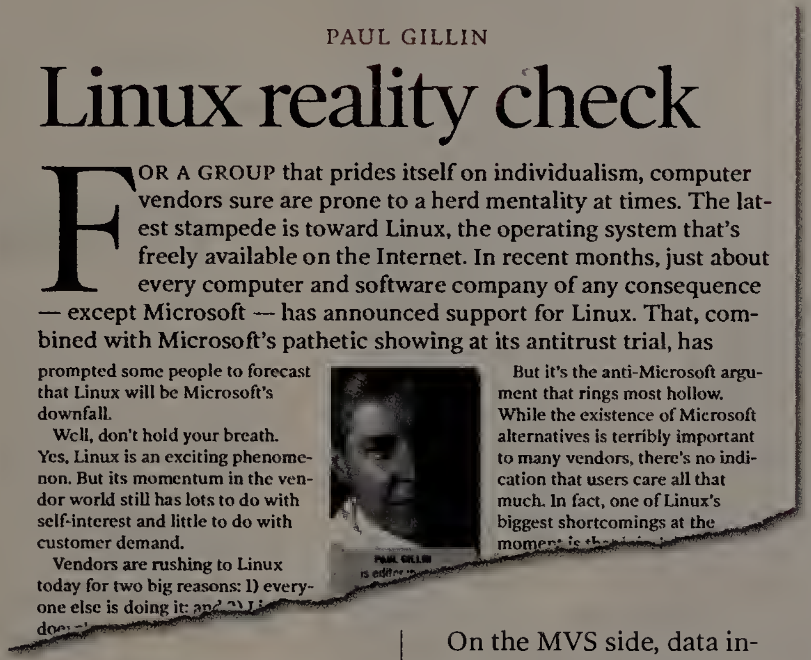
7. Symbols vs. text. With engineering drawings and specifications, most of the work is done through standard symbols and terms. In a project for a house, the landscape map by the contractor is drawn to scale, showing the drainage, drip watering, electrical wiring and trees and shrubs using standard symbols and a minimum of text. No confusion. Different construction companies do not create new or different symbols and terms to distinguish themselves from one another. But IT vendors strive to be different by inventing new, nonstandard terminology.

Though the fundamentals of engineering project management apply to IT projects, success will come only to those who are able to understand the key differences and evolve their project-management practices and tools accordingly. IT can make the job of managing projects less difficult by doing the following:

- Develop succinct projects and deliverable descriptions with quantified objectives and well-bounded scope statements.
- Limit most projects to four-month durations.
- Make design and code reuse a high priority.
- Collect and use historical effort data, without which most estimating will be a shot in the dark. ◗

READERS' LETTERS

Column stirs Linux debate: Here to stay, or gone tomorrow?



PAUL GILLIN

Linux reality check

FOR A GROUP that prides itself on individualism, computer vendors sure are prone to a herd mentality at times. The latest stampede is toward Linux, the operating system that's freely available on the Internet. In recent months, just about every computer and software company of any consequence — except Microsoft — has announced support for Linux. That, combined with Microsoft's pathetic showing at its antitrust trial, has prompted some people to forecast that Linux will be Microsoft's downfall.

Well, don't hold your breath. Yes, Linux is an exciting phenomenon. But its momentum in the vendor world still has lots to do with self-interest and little to do with customer demand.

Vendors are rushing to Linux today for two big reasons: 1) everyone else is doing it;

But it's the anti-Microsoft argument that rings most hollow. While the existence of Microsoft alternatives is terribly important to many vendors, there's no indication that users care all that much. In fact, one of Linux's biggest shortcomings at the

PAUL GILLIN

AS A HARDWARE/SOFTWARE engineer working with Linux, let me put Paul Gillin's fears to rest: Linux is here to stay! You say ["Linux Reality Check," CW, March 22] that if "corporate support" doesn't materialize for Linux, "it'll flame out faster than you can say 'network computer.' " Funny, Linux has been going from strength to strength since 1993 — without any of this "corporate support."

These "me-too" corporations clamoring to get on the Linux bandwagon and singing it's reliability tunes are basing their lyrics on a code base that had almost zero corporate support to help it get there. Why would it need corporate support to go forward?

No, it is vendors that need Linux's support rather than the other way around. Microsoft can undercut Linux by giving away a competing product for free.

Linux is a movement that says a good operating system should be free, open source and separate from the corporate clutches of a single megacorporation.

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I WAS BEGINNING to think that I was the only person in the world who believes that Linux is a computer-geek toy. This product reminds me of the early days (and, to some extent, these current days) of Unix.

When Linux supports the range of software and functionality that Windows 98 does, I'll believe that it's a reliable piece of software. If all I had to do was support server functionality, Windows NT would be as reliable.

When I worked as a consultant at Lucent, all of our major problems were related to the Unix-to-mainframe interface. And these were typically not mainframe-related interface problems.

We had the task of keeping Unix-based databases up-to-date with massive amounts of data on mainframe systems. They would throw data over the transom at MVS and then assume that everything worked. When it didn't work, people spent days getting things straightened out.

On the MVS side, data integrity across IMS and DB2 was maintained throughout. Unix, Linux, AIX, Windows — all the spiffy new stuff — has all of the same integrity and reliability problems that we went through — and solved — with the mainframe 20 years ago.

I really enjoyed your article and will watch for more of your gems.

Mike Gates
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> Why would Linux need corporate support to go forward?

I PARTLY AGREE with your assessment of vendor motivation to support Linux, but I disagree with you about user interest.

Vendors are delivering Linux because there is a demand for it. It's true that, for both the vendor and the user, non-Microsoft is a virtue.

We have had a long, sad and expensive experience with the company that believes that it owns our desktops. Linux distributions generally are released when ready, not nine months later than promised and six months before they're complete.

Linux has already won the hearts of many of us who simply want to get our work done without the operating system getting in the way and without quarterly hardware upgrades.

Office applications have been a weak spot, but with WordPerfect and StarOffice, we're getting there. Training is available, and support for downtime or throughput issues is required less often.

Besides, with Microsoft, do you get support, or do you just pay for it?

Larry Brunelle
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I WANTED TO compliment you on your article. I completely agree with your thoughts on the Linux movement. To make matters worse, the news media is pitching Linux and they can't even describe it!

I have non-IT people asking me if Microsoft is doomed because of Linux. Keep up the good work.

Bryan Bowers
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Silicon – Not a 'silly' matter to some

I'M,WRITIN' TO ya becuz I reckon I can't abide by no low-down, dirty-rotten varmint draggin' the good name of Payne County, Okla., through the manure ["Silicon Silliness," CW, March 22]. You quote some old boy in L.A. that don't think we know what silicon is. Why, durn near everyone 'round these parts learns about silicon at vo-tech school — it's that there white grease we use down at the lube rack on them fancy imports.

Seriously, never let it be said that we don't have a sense of humor here in Payne County. We have nothing against Silicon Valley — we recently bought a company there. The limits to being successful have nothing to do with geography, thanks in large part to the Web. It has to do with people and their ideas, vision and ability to translate all of that into reality. We merged with a larger company last year, and our location in Payne County was an advantage, not a liability. Why? Because we're home to the state's largest university, because people can afford to buy a house here and because there's no traffic, little crime and good public schools.

The next great technological innovation may not come from Payne County, but don't be surprised if it doesn't come from Silicon Valley or Silicon Alley, either.

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WHEN I READ "Silicon Silliness," the first thing that I did was to scan the list of high-tech cities.

Naturally, I expected to read about Huntsville, Ala., home to Werner Von Braun, Redstone Arsenal, NASA's George C. Marshall Space Flight Center, the U.S. Army Aviation and Missile Command, Intergraph Corp., Cummings Research Park and the 12,000 engineers who live and work here.

Huntsville is one of the great high-tech centers of the South. I have enjoyed a long and multifaceted career in software development almost exclusively in Huntsville. My network of friends and business associates includes database administrators, help desk workers, network engineers, software developers, software project managers and, of course, fellow rocket scientists. So how did you miss us?

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Monitoring IT projects' vital signs

I WAS STRUCK by the irony of Gopal K. Kapur's metaphor ["Bad Management to Blame for IT Skills Crunch," CW, March 22]. Mr. Kapur states that one of four management errors causing IT failure is "failure to monitor a project's vital signs."

He asks readers to "imagine a hospital where nurses and doctors don't routinely monitor patients' vital signs — the mortality rate is sure to soar."

The irony is that as an IT professional and a physician in the field of clinical computing, I find that the vital signs of health care IT aren't monitored and the cardiac arrest alarms (experts and management with appropriate skill set) are ignored.

Recent financial debacles in managed care organizations are basically due to failed information systems and strategies. Bad management is an understatement.

To Mr. Gopal's four points of bad management, I add a fifth, the "www.phenomenon": The wrong people making the wrong decisions at the wrong time. I have created a Web site (*http://members.aol.com/scotsilv/*) to address these shortcomings.

Scot Silverstein, M.D.
Clinical Computing Consultants
Wilmington, Del.
CCCDe@aol.com

You'll never guess what we were doing when we came up with the idea for our new server.

Actually, we were thinking of ways to help our clients reduce their total cost of operations. And it occurred to us that consolidating complicated IT environments would be a good place to start. Which, naturally, led to the development of the new Unisys Aquanta™ ES 5000 line of midrange servers based on the equally new Intel® Pentium® III Xeon™ processor. These robust servers help you handle workloads on multiple partitions, while maintaining single-image operations and management. And they improve availability by providing a fully recoverable environment for your applications, databases and transactions. For more points on our new servers, check out our Web site. Meanwhile, we'll be working on our, well, you know.

www.marketplace.unisys.com/ent/

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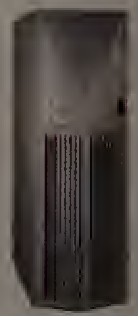
pentium® III xeon™



Aquanta ES 5000

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BUSINESS

SAVING CHINA

Software entrepreneur Chai Ling is trying to bring her Internet start-up back to China to help change the social fabric there. She says the Net's ability to link like-minded people can make it a political, not just an e-commerce, tool. ▸ **36**

TRUST E-BANKS?

Online banking scams are making it tough for legitimate banks to do business over the Internet. Industry groups are working to make the Internet more secure, but they still struggle to make it as safe as the local ATM. ▸ **46**

Y2K BLAME

Users are split on whether they like the laws Congress is considering to delay Y2K lawsuits and limit damages. Holding off lawsuits might encourage last-minute cooperation, but would it overprotect the underprepared? ▸ **38**

SELLING TO THE BOSS

Ever get a call from the boss wondering why you turned down that nice sales rep he just talked to? Being end-run by vendors you turn down isn't only annoying, it makes you look bad. Learn how to stop the practice. ▸ **42**

JUSTIFYING COSTS

User companies spend more on hardware than you'd expect, if it's true that computing power increases exponentially while not increasing much in price. Paul A. Strassmann finds the source of the discrepancy and a way to quantify how your hardware costs stack up. ▸ **44**

FACTORY FIX

Finding packaged software that would support ultraefficient flow manufacturing techniques is only the beginning for American Saw & Mfg. Co. The software requires remaking the entire plant to achieve dramatic savings. ▸ **40**

ROAD WEARY?

Skilled IT people often have to go where the trouble is — sometimes several days per week. How do you handle a tough IT job made tougher by a heavy travel schedule? We asked a crop of heavy-duty IT travelers for tips on how to handle the road — with ease. ▸ **53**

AUTOMATING METERS

Electric utility Enron thinks it can save $1 billion over 11 years by having Computer Sciences Corp. remotely handle meter-reading for Enron's commercial customers. With the deal, CSC gets a handle on a market it thinks will explode under deregulation. ▸ **41**

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JACK FOLEY

A DAY IN A TOP LEADER'S LIFE

WE FOLLOWED IT veteran Scott Farr (above) for a day on the job to see what it takes to be a top project manager. He navigates Y2K fixes, staff shortages and on-the-job politics to keep his New Hampshire medical center online. See how he makes it all work.

48

TIANANMEN ACTIVIST TURNS SOFTWARE ENTREPRENEUR

Nobel Prize-nominated dissident wants to build Web site of student interests

BY ANN HARRISON

SOFTWARE entrepreneur **Chai Ling** helped lead the student protest at Tiananmen Square in 1989, then lived in hiding for a year before escaping to Hong Kong — nailed inside a wooden crate. Nine years, two Nobel Peace Prize nominations and one Harvard Business School degree later, she's trying to return to China, with an e-commerce venture designed to create a student community online, out of reach of the tanks.

Jenzabar.com, her company in Cambridge, Mass., has developed a Web-based intranet application that aggregates information for college students and professors. It organizes information on class schedules, news feeds and other information chosen by students and posts it on a password-protected, personal Web site that also provides e-mail to the remote user.

The tool is being used by the Boston College Carroll School of Management. Ling is trying to partner with Internet service providers to offer content aggregation and hosting services to Chinese universities.

Q: Do you plan to go back to China?

A: I am looking forward to going back to China in the next four or five years when this generation of leaders leaves. The next generation of leaders will be much more open-minded. Back in 1989, when [President] Deng [Xiaoping] made the decision [to send troops into Tiananmen Square], it was such a tragedy because he did not understand profound changes in society.

Our generation had nothing to do with the Red Guard or the counter-revolution, but he didn't understand that. There was no free flow of information to let him know and appreciate the fruit and success of recent reform. That created tragedy in China. We hope that will be the last tragedy.

We hope that with information flow, they will be less insecure about losing control, and individuals will have more power and freedom.

Q: What can you tell us about doing business in China?

A: The biggest thing is that you have to negotiate with the whole institution, the whole system. They don't have a rule of law, so it is very difficult to do business in China and feel that property rights and intellectual property rights are protected. Every year, Microsoft loses a billion dollars because of software piracy.

The Chinese government likes to force people to do joint ventures with China and the Chinese Communist Party. I've heard horror stories about this kind of practice. The Chinese Communist Party takes all the money and sets up competing factories in the exact same business where they can take that technology and the patents and have all the control.

There is risk to doing business in China. But there is an effort to push the Chinese government to open up the system and do two simple things: free the media and create a rule of law. [That way, Chinese markets will be more attractive to] foreign companies.

THE ASSOCIATED PRESS

DISPLAYING THE FAMOUS SHOT of an unarmed Chinese man facing a row of tanks, Chai Ling is also fighting for freedom in China

Q: Why did you found Jenzabar.com?

A: I felt there was no real network to support college students. Before, there were geographic, decision-making and bureaucratic barriers. Now, the Internet offers a chance to build this global network. Intercollegial relationships can be [global] relationships.

Q: But the Chinese government controls students' access to the Internet?

A: Oh yes. Right now, they are monitoring all the access to the World Wide Web and who's using it to do what. But the Internet is much more powerful, and they should give up and let the information flow.

Q: Do you think the more opportunities people have to communicate online, the more difficult it will be for Chinese authorities to monitor information?

A: Yes. Absolutely. If 1.2 billion people are all online, they are probably going to have a hard time doing that. But it still costs a couple of dollars to access [Internet provider] services on an hourly basis and for most Chinese, their average monthly salary is $15 to $20.

So that is a substantial amount of [their] income to get access to information, and they are being monitored. So we want to give away tools and find an [Internet provider] that will work with us to bring effective access.

Q: Many people in the U.S. first access the Internet at universities. Do you think that will be the case in China?

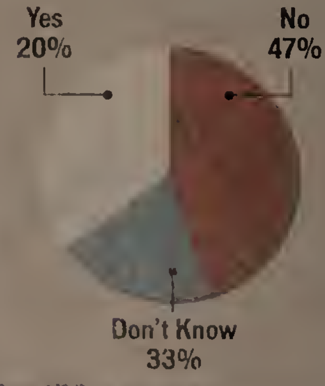
A: Yes, that is exactly why we wanted to provide tools for the college market. The kids are well-educated; they are Web-savvy; they are more used to using the Internet as a new medium; they trust it more. I want to provide applications and channels to help them organize their education and help them build community and build friendships and stay connected even when they leave college.

Whatever they want to achieve, they will be part of the larger network and stay there for a lifetime. That's our commitment to users. ▸

SNAPSHOT

Web Attacks

Has your Web site suffered unauthorized access or misuse within the past 12 months?



Base: 479 IT security managers

SOURCE: COMPUTER SECURITY INSTITUTE, SAN FRANCISCO

Companies Take Personal Approach to Net

Tools tailor response to each customer

BY JULIA KING

Two companies have announced software and services designed to make selling on the Web more personal.

For $4,000 per month, New Channel Inc. in Redwood City, Calif., transparently monitors customers' behavior on companies' Web sites, collecting data that lets those companies develop more-targeted sales and marketing programs. A New Channel applet sits on the Web server, monitoring user activity and funneling information about visitors' behavior to data collection servers housed at New Channel.

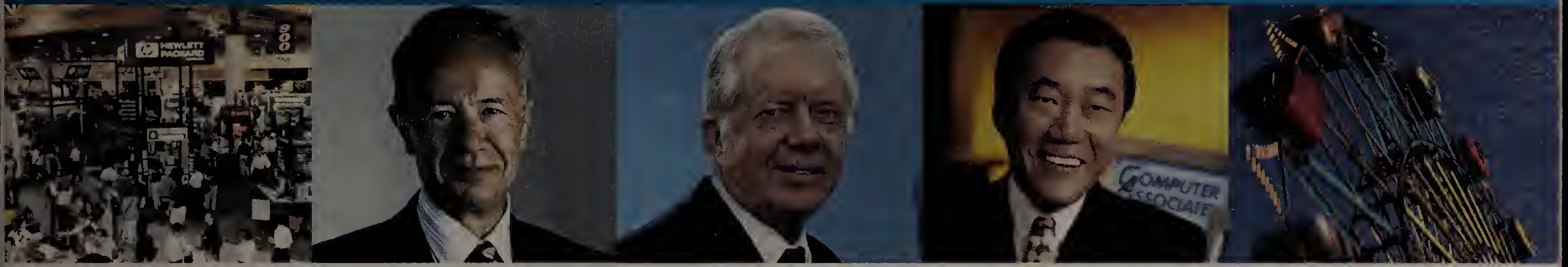
The service also lets customer-service representatives interact personally with customers — via text-based chat — as visitors peruse a Web site. For example, a service representative might ask customers looking at fall-blooming garden plants if they also want detailed information about companion plants that bloom in spring.

Consolidated Freightways in Menlo Park, Calif., uses the technology to help online customers as they work their way through a set of complex rates and schedules, said Joe Schillaci, vice president of sales. Before, online customers clicked an on-screen "call-me" button if they had questions.

Newark, Calif.-based iLux Corp. also bills its Suite 2000 software as a Web-based marketing tool. Among other things, the software captures and stores data about a customer's current Web-site visit and combines it with data from that person's previous visits.

That data can be merged with data about that customer's catalogue-buying behavior to give companies a comprehensive view of customers who buy their products via multiple sales channels. Pricing for the enterprise iLux Suite 2000 software begins at $30,000 for an NT version. The software also runs on Solaris machines. ▸

The Most Fun You Can Have With Your Boss Watching.



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USERS MIXED ON RULES TO LIMIT Y2K LIABILITY

Some say damage cap unfairly protects companies that deliberately stall work

BY PATRICK THIBODEAU
WASHINGTON

A REPUBLICAN-LED drive in Congress to set limits on year 2000 litigation is getting mixed reviews from information technology professionals.

On one side is Lisa Bender, the information systems manager at Falcon Plastics Inc. She believes the legislation — which sets a 90-day cooling-off period before litigation can commence — will encourage supply-chain partners to resolve problems.

"I want people to work on my fixes rather than [be] preparing for litigation," Bender said. "I think it will help in getting these fixes faster." The Brookings, S.D.-based company makes custom plastic parts for automotive, medical and other industries.

But Leon Kappelman, head of the Society for Information Management's Year 2000 Special Interest Group in Chicago, said limiting liability is wrong and helps companies "who dragged their feet on getting Y2K work done."

Those companies, Kappelman said, "will be rewarded for their dishonesty, mismanagement or negligence while those who took care of their Y2K business will get stuck with the bills" of repairing year 2000 problems.

Common Ground

Senate Commerce Committee Chairman John McCain (R-Ariz.) and Sen. Ron Wyden (D-Ore.) are the leading proponents of the legislation. In an effort to win White House backing and Democratic support, the senators last week dropped some of the more controversial provisions of the legislation, punitive caps and protections for corporate officers and directors, but kept the cooling-off period. The House may seek other changes.

The legislation is supported by many industry trade associations and insurance groups.

"Once a lawyer gets involved, you don't have an opportunity to work things out," said Jan Amundson, general counsel of the National Association of Manufacturers in Washington. Congressional action is expected this month.

Estimates on year 2000-related legal costs vary greatly, but most are many billions of dollars. Just over 60 year 2000-related lawsuits have been filed so far in the U.S., most seeking compliant software from vendors.

Many law firms have established Y2K practice groups to handle potential litigation.

Walter Andrews, a partner in the Year 2000 Practice Group at Wiley, Rien & Fielding in Washington, said his firm is helping companies protect themselves from litigation by conducting legal audits, determining what their potential exposure may be and reviewing contracts.

Some states, such as Colorado, have also implemented liability-limiting legislation. Federal legislation would preempt those efforts, setting a single national standard. Such a standard would help large companies operating in multiple states, said Dale Vecchio, an analyst at Gartner Group Inc. in Stamford, Conn. ◗

JUST THE FACTS

Congress Acts

Congress is considering plans to limit Y2K liability. Key provisions include:

- **Anywhere from a 30- to 90-day cooling-off period before litigation can commence. The intent is to encourage remediation before going to court.**
- **The leading proposal in Congress would cap punitive damages for firms with fewer than 50 employees. There would be no cap for larger firms.**
- **Users have a duty to mitigate any potential year 2000-related loss. If a user has no contingency plan to deal with a supply chain interruption, for instance, it could hurt a compensation claim.**

July Could Be a Hot Month for Failures

Report predicts breakdowns to occur in phases, ebb at year's end

BY KATHLEEN OHLSON

This July, not January, is the month to watch for the next big wave of year 2000 failures, according to a new Gartner Group Inc. report.

"The biggest [misconception] is when the failures will occur," said Lou Marcoccio, Gartner's year 2000 analyst in Stamford, Conn. The Gartner report estimates that only 8% to 10% of year 2000-related breakdowns will occur at the end of December and the beginning of January, he said.

Failures will begin in phases, first in July, as some companies enter their new fiscal year and face date issues that haven't been fixed or were fixed incorrectly, Marcoccio said.

By October, the number of failures should increase as systems that forecast the first quarter start to have errors and an additional one-third of companies enter their new fiscal year, he said.

A little more than half of all eventual failures will hit by the end of the year, and the failure rate will "remain way up there for three quarters of 2000, when [failures] start tailing down," Marcoccio said.

SNAPSHOT

Competitor Comparison

How the top three general merchandise retailers are doing on their year 2000 work:

	WAL-MART	SEARS	KMART
Fortune 500 rank	3	15	21
Costs as of January	$8M	$30M	$51M
Estimated costs	$27M	$65M	$75M
Notes	Final testing scheduled for October	Expects full compliance by November	Integration tests to be done for rest of year

SOURCE: COMPANIES' LATEST 10-K FILINGS WITH SECURITIES AND EXCHANGE COMMISSION

Meanwhile, software vendors aren't pulling their weight, he said. Of all commercial packaged software, 81% isn't year 2000-compliant, down from 88% two quarters ago, he said.

More disturbing is that 6% of software stated to be compliant is in fact not because patches and updates are thrown together with little concern for quality control, Marcoccio said.

That finding is borne out by New York-based software firm Cap Gemini America, which studies the year 2000-readiness of various applications for clients. It has found that 10% to 15% of Y2K-ready packaged applications contain an average of four or five bugs per program. ◗

Michael MacMillan, a reporter at Computerworld Canada, *contributed to this report.*

Companies Optimistic in Y2K Filings

Airline, products company on track, according to SEC

In recent filings with the Securities and Exchange Commission, Continental Airlines Inc. and Procter & Gamble Co. expressed little concern about their year 2000 readiness. One company cited outsourcing as the reason behind low remediation costs.

Y2K

Here are details from last week's filings with the SEC:

Continental Airlines Inc.,

Houston

Project started: Late 1996.
Systems to be evaluated and fixed: Unspecified internal and third-party systems.
Status: Expects fixes to be done by June.
Partners: The airline is visiting and talking to its major suppliers, vendors and governmental agencies such as the Federal Aviation Administration.
Contingency plans: Now being updated, with revised plans expected by September.
Cost: $16 million to $18 million ($16 million spent as of March 31). The relatively low cost is due to substantial outsourcing and because many systems were replaced when the company came out of bankruptcy in 1993.

Procter & Gamble Co.,

Cincinnati

Status: Expects the required changes to critical systems to be made by June. As of March, critical manufacturing, operating and control systems were 96% complete. Other critical systems were 98% complete.

Testing and certification of those systems is expected by Dec. 31.

Costs: Expected to total approximately $100 million, of which 75% has been spent to date. ◗

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MANUFACTURING

FLOW APPROACH TO CUT TOOL-MAKING COSTS

But it requires major overhaul of plant

BY CRAIG STEDMAN

FOR AMERICAN SAW & Manufacturing Co., build-to-order flow manufacturing is the cutting edge that's expected to help slash its production cycles and inventory costs by 50% or more.

Those potential benefits are pushing American Saw to reorganize its entire plant in East Longmeadow, Mass., to the flow approach, which replaces traditional manufacturing setups of stand-alone departments with integrated production lines that schedule work only when orders are placed.

But preparing for the switch, and the installation of packaged software that supports flow techniques, is requiring more than a year of work devoted to redesigning the company's plant, putting together a transition plan and retraining factory workers.

The transition is expected to take another six to nine months after it starts this fall. "There's a lot of equipment that's going to have to move, and we need to sequence it properly so we don't put ourselves out of business," said project manager Tom Demers.

That's the way it usually works with flow systems, which prompts many manufacturers to start more conservatively with flow pilots on one or two production lines [CW, Dec. 14].

Companies often start to see "dramatic" inventory savings in a matter of weeks, said Dave Monroe, an analyst at Plant-Wide Research Group in North Billerica, Mass. "But you literally have to re-create your plant," he added.

American Saw, a $100 million maker of saw blades and hand tools, is switching to flow in one fell swoop as part of an installation of Oracle Corp.'s enterprise resource planning applications. Finance and purchasing are due to go live next month and will be followed in October or November by Oracle's year-old flow module and its inventory and materials management software.

Looking Ahead

The project has twin goals: cutting costs and making American Saw more responsive to customers. A full payback could take five years, said Demers, a former finance manager who declined to disclose the firm's total investment.

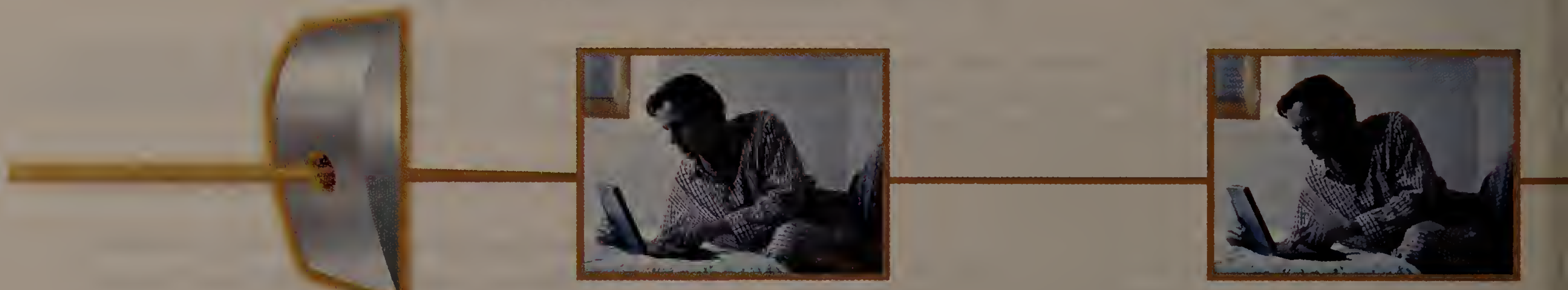
But the company expects to start getting "significant" inventory reduction benefits from the flow piece just three to six months after finishing the rollout next spring, he said.

Jim Holston, a manufacturing manager who's leading the flow rollout team, said the anticipated inventory savings should also reduce the floor space needed to meet current production levels by up to 20%. That will free up room so the company can grow without having to build a new plant.

But designing the new production lines "has been a major effort" involving about 25 business managers, who started on the layout last September and are just finishing it now, Holston said.

Creating a detailed plan for the changeover could take another two to three months, Demers said. Another big issue is training production workers to handle multiple jobs — a typical requirement of flow setups.

"This is going to change things a lot on them," Demers said. "We don't kid ourselves there. We're going to have to continue to ride herd on that for some time." ◗



This IT manager is monitoring capacity in Chicago.

This IT manager is paying bills for Dallas.

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UTILITY OUTSOURCES BILLING, METER-READING, MAY SAVE $1B

CSC sees Enron Energy deal as entry into gas and electric market

BY JULIA KING

THERE'S $20 billion to be made annually in the deregulated gas and electric meter-reading and billing business, and Computer Sciences Corp. is looking to grab its share early on.

Late last month, the $30 billion information technology services company in El Segundo, Calif., made its first move, acquiring the back-office billing systems and more than 300 employees from Houston-based Enron Energy Services.

In return, Enron became CSC's first customer for outsourced meter-reading and billing services.

The deal calls for CSC to take over reading meters and processing bills for Federal Express Corp., Ocean Spray Cranberries Inc. and Enron's 1,200 other large, geographically dispersed commercial and industrial customers. It's also expected to save Enron more than $1 billion over the next 11 years.

That's because Enron will no longer have to consolidate energy usage information from more than 3,000 different U.S. utilities to present its own nationwide commercial customers with a single bill: CSC will do it for them. The company will also do it for other big energy companies that enlist its services as they're deregulated on a state-by-state basis.

"The reason we outsourced billing is not that we don't understand billing, but because of the complication inherent in it," said Enron spokeswoman Peggy Mahoney. "Our core business is energy, not billing."

Billing, meanwhile, represents a gold mine to CSC.

"For every city or region where deregulation occurs, companies will need billing, meter-reading and data-collection systems," said Mike Beebe, CSC's partner in charge of energy markets. He declined to specify what CSC will earn from the Enron deal.

About 20 million of the 200 million U.S. commercial and residential utility meters have been deregulated. CSC said it expects the remaining 80% to be deregulated by 2006.

Between now and then, CSC plans to partner with utilities or other companies that acquire ownership of customers' meters. Eventually, its business-process outsourcing services will include reading those meters electronically, processing the data and presenting electronic bills to both commercial and retail customers via the Internet.

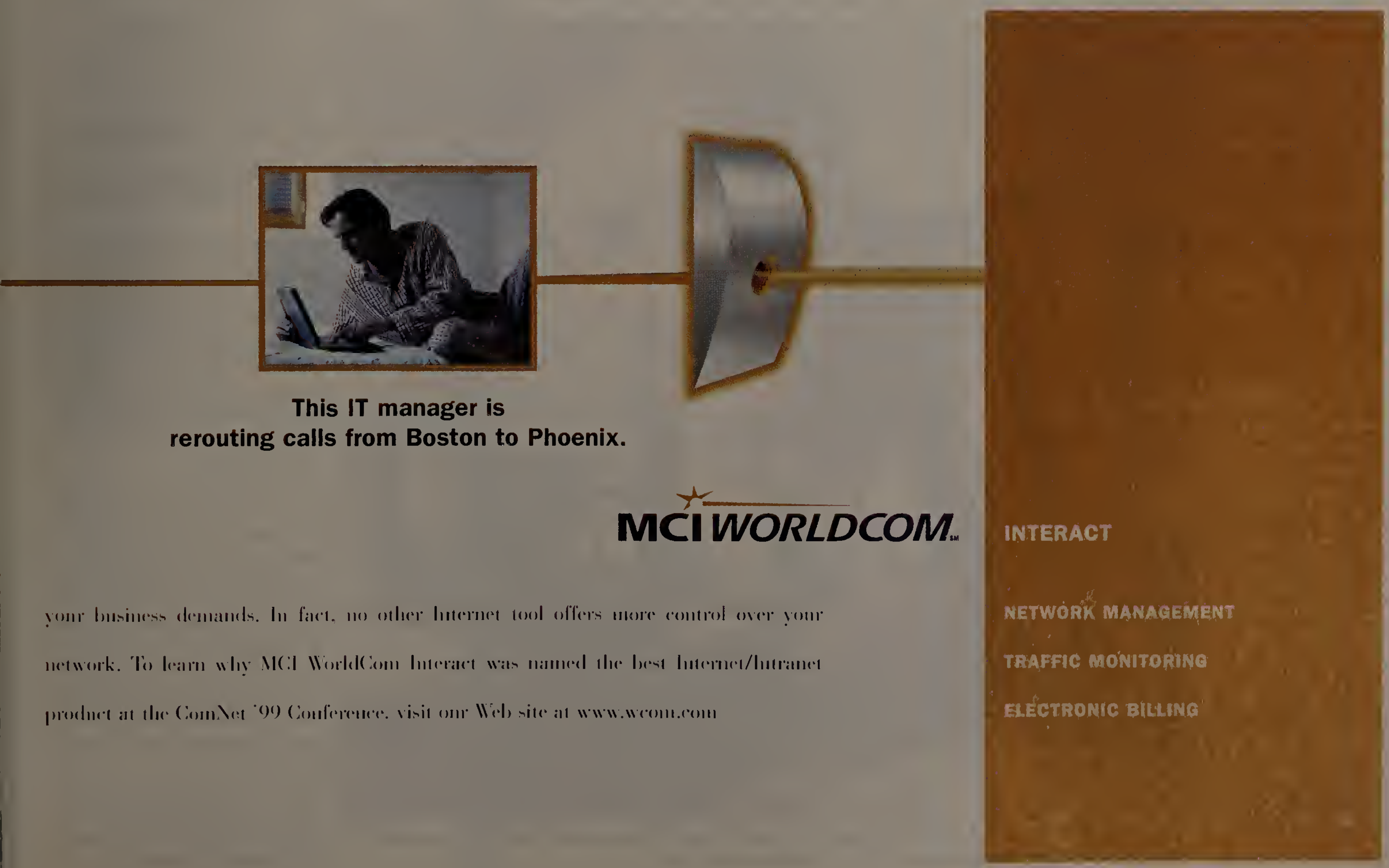
Beebe said he expects CSC to provide Net-based bills to Enron customers within a year.

Eric Blantz, an analyst at Dataquest in Mountain View, Calif., said the Enron deal indicates that CSC intends to expand its outsourcing services well beyond traditional IT services, such as maintaining applications and running data centers. "This is a major first move [on CSC's part]," Blantz said. "This deal with Enron shows the scope of services CSC is trying to move into." ◗

JUST THE FACTS

Highlights of the CSC/Enron business-process outsourcing deal:

- **Enron projects $1.1 billion in savings during 11 years**
- **320 Enron employees and contractors transfer to CSC**
- **CSC acquires Enron's back-end billing systems and other IT assets**
- **CSC enters the $20-billion-per-year energy services market**



This IT manager is rerouting calls from Boston to Phoenix.

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STOPPING THE VENDOR END RUN

IT vendors will sometimes go over your head to score a sale. We look at several ways to thwart their tactics

BY ERIK SHERMAN

PAUL MUELLER, vice president of communications technology services at trucking giant Schneider National Inc. in Green Bay, Wis., had just informed a vendor that it didn't make the cut.

Instead of getting on with business, the disgruntled supplier sent a letter to Schneider National's CEO, admonishing Mueller for his decision. Of course, Mueller had to address the issue, but the technique backfired.

"Suffice it to say, we never did establish a business relationship with that vendor," Mueller says.

He was another target of a vendor end run, which happens when a salesperson in pursuit of an order is turned down by a midlevel information technology manager and goes over the manager's head to a hopefully more gullible executive. Mildly irritating at best, disruptive at worst, this technique is unlikely to disappear any time soon. But there are steps companies can take to minimize the problem.

Making the Sale

End-run tactics are many and subtle. Some salespeople call a CEO, get pointed to IT by a secretary and then tell a technical manager that the president asked them to call.

A marketing director at a network integration firm, who asked to remain anonymous, has seen vendors that lose out during the request for proposals process call the CEO or chief financial officer to withdraw their bid, decrying an "unfair" process. Their hope is that the ensuing trouble will result in a more favorable decision.

But most end runs happen on cold calls, because few suppliers will risk established relationships. "They'll try me. If that doesn't work, they'll try the chief financial officer; they'll try the CEO," says Ken Brame, CIO at catalog retailer Service Merchandise Co. in Brentwood, Tenn. Brame cites "hot topic of the day" vendors — like outsourcing firms and e-commerce companies — as the worst offenders. "They're always trying to use that leverage [of a popular topic] to get their foot in the door; that they have a magic solution," he adds.

The pain of end runs isn't unwanted solutions foisted upon the unwilling so much as the hours stolen from busy days as employees defend technical decisions. And then there's the personal insult of IT being treated as secondary by senior executives who buckle under.

"I just see an awful lot of wooing going on," laughs Maribeth Anderson, manager of technology at First Chicago Mercantile Services in Chicago. "I want to see some more wooing for me. I'm the one who has to buy in to the technology solution."

Ironically, Mitchell Parker, regional sales manager at a Web software vendor, thinks end runs are a misapplication of something that's important to both vendors and IT. Many purchases require several signoffs, so both sides must cooperate to secure necessary authorizations.

"People buy from people they like," Parker says. "If you just start calling high [over the head of your contact], you're not going to get a relationship when it's over. The odds of getting a sale at that point are even less than they were before."

TAMERA REYNOLDS

IF AN IT VENDOR'S BRASH SALES REP wants to pitch Ken Brame of Service Merchandise, Brame may be sipping from a coffee mug emblazoned with a competing vendor's logo

Setting up Barriers

The best defense seems to be creating a corporate culture that encourages cooperative behavior from vendors and that reinforces procedures for evaluating technology. Schneider National, for example, has strategic relationships with vendors, including written core business principles and a biannual supplier conference, which discourage end-run sales tactics. Boston publisher Houghton Mifflin Co. creates a coordinated front via monthly managers meetings and an architectural group that sets standards, so word gets around about vendor activities.

"If a large vendor comes in, we're usually aware of it within 30 days that they're talking to someone," explains Mark Mooney, Houghton Mifflin's chief technology officer. In addition, management insists on referring initial vendor inquiries to the appropriate IT personnel.

For those times when a salesperson gets around the institutional barriers, some managers keep discouragement tactics up their sleeves. Brame has a collection of vendor coffee mugs so that when he meets with an offending salesperson, he can walk in with a competitor's logo.

Anderson insists that vendors be on an approved list for Bank One Corp., First Chicago's parent. Getting through the screening process to be added to that list is arduous, involving reviews by legal and purchasing staff to ensure that the company can live with any contract. Requiring the screening for any vendor is sensible management for Anderson anyway, but it also carries the added advantage of discouraging the overly persistent.

"If they really want to be there, they have to go through the process. They either get on the list and call me back after a while, or I don't hear from them again," Anderson says.

> "I want to see some more wooing for me. I'm the one who has to buy in to the technology solution.
>
> MARIBETH ANDERSON, FIRST CHICAGO MERCANTILE SERVICES

Mooney receives up to 10 calls per day from vendors, many trying to go beyond the people who work for him, so he usually has an assistant answer his phone.

And the truly persistent should beware, because CEOs may take revenge. Mooney remembers at a previous job a mainframe vendor insisted on meeting with the CEO, the type of person who wouldn't hesitate to teach a vendor a lesson. "After a two-hour presentation, the CEO told the [vendor's] sales group, 'You have to talk to my technical people.' " ▶

Sherman is a freelance writer in Marshfield, Mass. Contact him at esherman@reporters.net.

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BRIEFS

Gas Company Outsources

A unit of Tulsa, Okla.-based Williams Cos. has signed a $20 million, multisite application outsourcing agreement with Keane Inc. The four-year deal calls for Boston-based Keane to support Williams Gas Pipeline's customer service and rate systems. Keane will use performance metrics at four Williams sites to measure work volume, quality, cost, cycle times and customer satisfaction.

$7.5M Pact for App Maintenance

Schroder Investment Management Ltd. awarded a $7.5 million, multiyear application maintenance outsourcing contract to IMRglobal Corp., an information technology services company in Clearwater, Fla. The new contract follows a previous three-year agreement under which IMR performed year 2000 remediation and euro conversion work for Schroder.

Insurer Automates

Mastech Corp. in Pittsburgh has said it's implementing Siebel Systems Inc.'s automated sales software at Country Companies., a Bloomington, Ill.-based insurance company with about 1,200 agents nationwide. Mastech said it expects the installation at Country's customer call centers to be completed by next March.

NEW REPORTS

ERP Services

Services represent 55% to 70% of the total cost of an enterprise resource planning (ERP) implementation, compared with software licenses, which make up 20%, according to Dataquest.

In a new report titled "ERP Software Vendors: Professional Services Powerhouses?" the San Jose research firm outlines what professional services the major ERP companies are offering as well as those of their competitors.

The report costs $1,295.

www.dataquest.com

Handheld Apps

Although there are more than 13,000 developers creating software for 3Com Corp.'s Palm OS and Microsoft Corp.'s Windows CE, many of those developers are small companies that have banked on the handheld market, according to "Software: What's Hot for Handhelds," a report from International Data Corp. in Framingham, Mass. The handheld market is still at least a year away from attracting major developers, the report says.

The report costs $2,500.

www.idc.com

Worldwide Spending on Training

What companies worldwide will spend annually on IT training. Projections in billions of dollars

	1999	2000	2001
U.S.	$6.95	$7.13	$7.38
Europe	$5.73	$5.92	$6.51
Asia-Pacific	$4.04	$4.09	$4.95
Latin America	$0.62	$0.63	$0.77
Rest of world	$0.71	$0.73	$0.89
Total	$18.04	$18.50	$20.49

OURCE MPUTER ECONOMICS INC CARLSBAD, CALIF

PAUL A. STRASSMANN

IT paradox number

THE IDEA THAT SOMETHING is amiss with IT investments dates back at least 15 years to when Nobel Prize-winning economist Bob Solow quipped that computers are everywhere except in the economic statistics. Hence, the productivity paradox: the inability to convincingly demonstrate that our investments in technology have resulted in measurable productivity improvements.

Much has been written about the phenomenon. But nobody has yet offered a number that would help executives define whether their own company's productivity paradox is small or large. I'd like to introduce a way. I call it the IT paradox number, the difference between a firm's actual computer hardware spending and what Moore's Law would predict it to be.

Moore's Law states that the number of transistors that can be crammed into a semiconductor chip doubles every 24 months without increasing the costs of making it. That means that electronics costs can decline 33.3% annually.

The U.S. Department of Commerce settled on an average decrease in "IT costs" at a compound annual rate of 17.5%. It applies that number to economic calculations such as the gross domestic product and the cost-of-living indicators.

> *The number can be calculated . . . for any [IT] budget.*

Hence, the formula for calculating one's own IT paradox number: It's your company's IT budget today, compared with what it could have been if you had previously bought your computing capacity every year for 17.5% less.

If you're alarmed by your company's paradox number, I can offer some consolation: You have company.

I have been tracking corporate IT costs for a long time. U.S. corporate computer hardware costs increased from $67 billion in 1990 to $153 billion last year. If Moore's Law would have delivered to its full potential, the 1998 IT budgets would have bought $558 billion worth of computing power. Therefore, the U.S. corporate IT paradox number now stands at $405 billion, the difference between $558 billion and $153 billion.

The objections to such a calculation will come from those who claim that computers now do much more, and therefore the additional spending is justified.

I'm not so sure. If CIOs can explain to their executive committees that they delivered 833% more computer-induced business capabilities ($558 billion divided by $67 billion) since 1990, I will gladly acknowledge that Moore's Law applies not only to semiconductor manufacturing, but also to IT budgets.

What, then, explains the differences between the potential gains of Moore's Law and the harsh realities of IT spending?

1. Bloated software. Whatever performance gains one gets from electronics manufacturers is chewed up by software that compensates for its inadequacies by gobbling up all the computing power it can get.

2. Excessive support costs. Hardware maintenance and support costs are included in the reported hardware budgets. The total cost of ownership of a desktop computer now includes as little as 10% for hardware depreciation. Most costs are for expensive support labor to keep the hardware alive and to tranquilize unhappy customers.

3. Negligent systems engineering. Corporate hardware assets are put in place with hardly any configuration management, safeguards against early obsolescence or provisions for future growth. The hardware landscape of most corporations looks to me more like a shantytown than a metropolis.

The consequences of those effects generate the paradox number. Hardware is acquired and junked for no reason other than IT's inability to cope with what it already has. What appears as inexpensive hardware is purchased (or outsourced) as the preferred solution to the software bloat, uncontrolled support costs and improvised systems engineering.

The IT paradox number can be calculated by anyone and for any corporate computer budget. It may be a good idea for a corporate CIO to know what this number is before some smart chief financial officer brings it up next time budget cuts are on the agenda. ▶

Strassmann (paul@strassmann.com) is still looking for the one organization that can explain its IT spending by applying Moore's Law.

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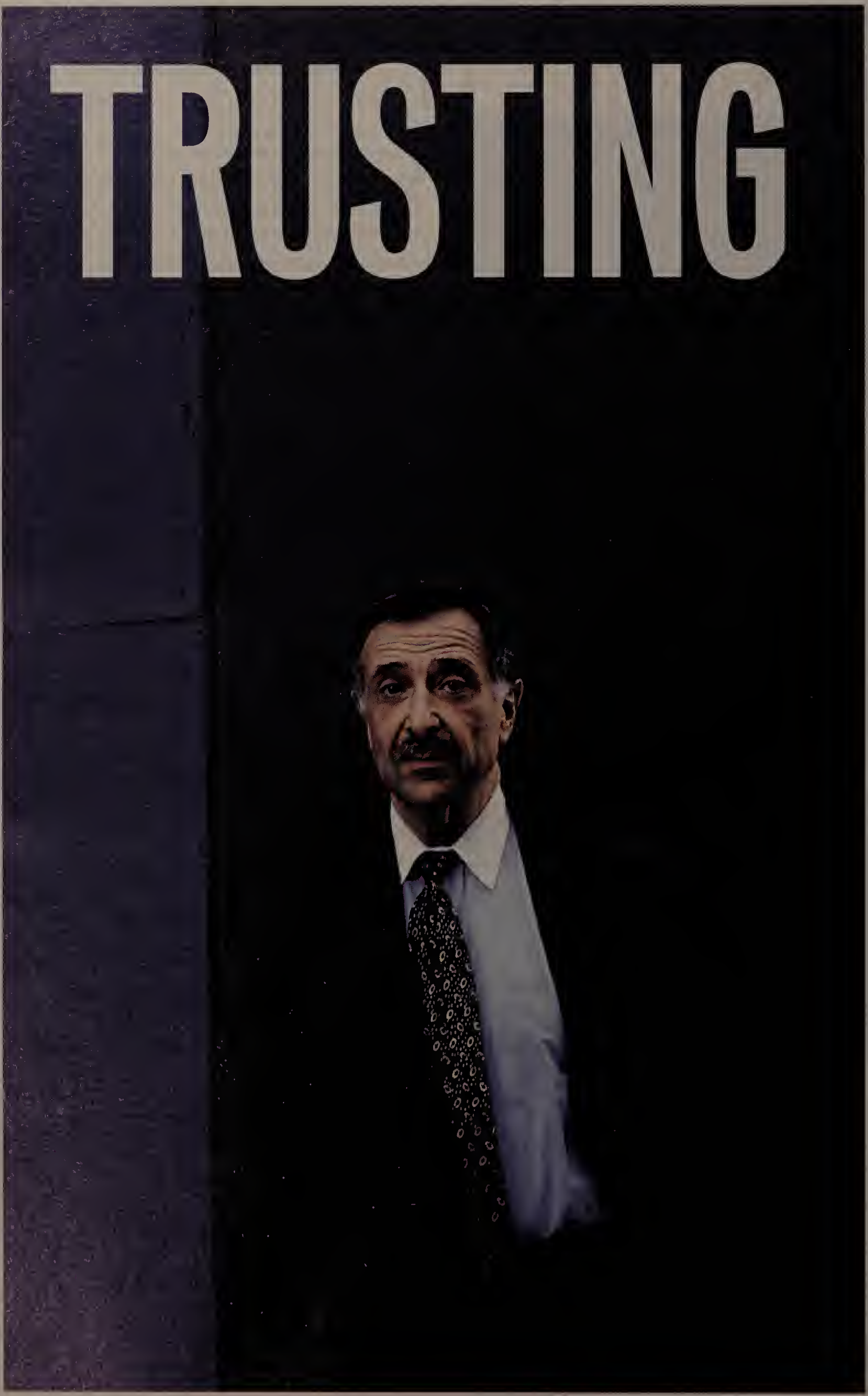
PETER SERLIN

When Netware International Bank guaranteed 20% interest on savings and near-prime loans, the North Carolina Office of the Commissioner of Banks started getting inquiries. Lots of them. A little research proved that Internet bank was no bank at all. It had no license. No recognition by any regulatory agency. And no deposit insurance, despite its claims to the contrary.

"Another catch: It cost you $500 to join the bank, then you could solicit others to join and get a portion of their fee," says Otis Meacham, the state's deputy commissioner of banks.

When the FBI, Internal Revenue Service and U.S. Postal Service raided Netware's small office in Mooresville, N.C., they seized $1.2 million in deposits to another bank plus a plane, boat and car purchased with deposits from unsuspecting consumers. In February, Netware proprietor David Allen Bear pleaded guilty to unlawful sale of unregistered securities and now awaits sentencing, which could include up to five years in prison and a $250,000 fine.

Currently, warnings on some 45 Internet banks are posted on the Federal Deposit Insurance Corp.'s (FDIC) Suspicious Internet Banking Web page *(www.fdic.gov/consumer/suspicious)*.

Bad Reputation

The emergence of such Internet banking and securities scams causes legitimate Internet banks to fear for their reputations, says Paul Raines, vice president of electronic security at the Federal Reserve Bank of New York.

"Banks are pouring hundreds of millions of dollars into establishing a Web presence," but it takes only a few fraudulent institutions to drive customers from sites of above-board banks, he asserts.

Of the 10,500 FDIC-regulated banks, 3,000 have a Web site. And as of mid-March, transactions could be conducted at 465 of them, according to FDIC senior policy analyst Jeff Kopchik.

If these banks are to see any signifi-

STEVE KATZ OF CITIGROUP: "The Internet is essentially a securable environment; but it will take a lot of effort"

NET

A few online banking scams are making the Internet a tough place for many legitimate banks to do business. But industry groups are looking to make the Net more secure By Deborah Radcliff

cant return on their e-commerce investments, Raines contends, the private sector must move quickly to develop a trusted, universal e-commerce framework and establish a comprehensive Web banking certification program. But that's not easy, says Steve Katz, chief information security officer at $7.6 billion Citigroup Inc., the New York-based holding company for Citibank.

"The Internet is essentially a securable environment, but it will take a lot of effort," explains Katz, who was responsible for ensuring data security for Citibank's Internet-based Direct Access program. The service, which went online in 1997, allows customers to pay bills, view accounts and transfer funds over the Internet.

Like other early Internet banking adopters, Citibank's system relies on user passwords to identify clients and 128-bit, Secure Sockets Layer browser-level encryption for securing account transactions.

But for interbank transfers and other forms of electronic money to become a reality, a global public-key infrastructure — in which a digital signature is held in good standing between parties at each end of a transaction — must be adopted.

The biggest issue facing banks: Who will manage and validate those digital signatures?

"The technical aspects would have to be enforced through a certifying authority, which could be a banking and/or accounting industry consortium," Raines says.

Two industry consortiums have recently introduced their visions of public-key frameworks built on commercially available public-key technologies, in which banks would act as certifying authorities.

In October, an eight-bank consortium announced plans to form a Global Trust Enterprise for business-to-business banking and e-commerce. The as-yet-unnamed, for-profit company is building a network of financial institutions to operate as public-key certificate authorities. The group expects to begin testing its technology next year.

And in March, the Washington-based American Bankers Association (ABA) introduced a first-of-its-kind electronic signature for business-to-consumer electronic banking in the form of an avocado-and-navy-colored logo, SiteCertain, which is like a Good Housekeeping Seal for Internet banks. SiteCertain is available to any interested bank and is offered as a free service to ABA member banks, which represent 90% of the banking industry. Fifteen ABA members are now testing SiteCertain.

Logos a Good Strategy

Raines and others say the logos are a step in the right direction because they give consumers strong assurances that they're dealing with legitimate Internet banks. In the long run, such a confidence mechanism "accomplishes the goal of protecting e-commerce and banking markets from fraud," says Kawika Daguio, the ABA's federal representative for payment systems and technology policy.

In addition, a new ABA for-profit spinoff, ABAecom, is positioning itself to be a certificate-validation authority for Internet banks and merchants.

A banking seal and certificate validation from the banking industry are the only viable ways to conduct electronic banking and e-commerce with an acceptable level of confidence, contends Ron Starzinski, lead information security analyst at Minneapolis-based financial services, banking and insurance group Lutheran Brotherhood. He also helped write the Federal Reserve Bank of Minneapolis' information security manual in the early 1990s. "SiteCertain is enlightening because this is a nice application of what a [digital] certificate would look like," Starzinski says.

Starzinski and Citibank's Katz say vendor technology to pull this all together exists. And vendor-to-bank and vendor-to-vendor cooperation is improving, they say. That's evidenced by ABAecom and the Global Trust Enterprise, both of which have teamed with cryptography vendors and public-key authorities to accomplish those goals.

But Raines says efforts are still fragmented as vendors and banks build pieces of this much-needed trust network in separate sandboxes.

"[Banks and vendors] are hitting all around the issue. One handles privacy, the other, technical configuration and another, certification," he says. "If the banking industry is pouring all these millions into their Web sites, they should protect those investments by having some sort of overall Internet-banking certification program."

The pieces that still need to fall into place include technical details like protocol consistency, compliance and a communications mechanism that lets banks and certificate authorities talk to one another, Starzinski says.

The ABA and Global Trust Enterprise need to take a more comprehensive approach to certificate validation. The body that oversees the validation of certificates must also have access to lists of expired certificates, he adds. "The big catch is revocation. Certificate authorities don't manage revocation lists. When you're talking about cross-certification, it's problematic figuring out who has live certificates," he says.

Pulling It Together

Although no one was able to offer a time line for deployment of a widespread, trusted Internet banking and securities network, indicators suggest it will take at least another year for the remaining pieces to fall into place.

Lutheran Brotherhood, which in March acquired a $22 million, full-service banking thrift, will wait for those issues to be worked out before deploying electronic money and interbank transfer systems over the Internet. Citibank's Katz concurs.

In the meantime, regulators worry about banks exercising due diligence when putting out any new electronic products, Raines says. "We want to make sure this electronic-money system isn't easily defrauded. If fraud happens, that means a reputational risk to the bank," he explains.

Reputation, Katz says, is as much a commodity as a bank's deposits. "Banks have two products: money and trust. The key one is trust," he says. "Regardless of the medium, our role is to make sure that trust commitment is met." ◗

Radcliff is a freelance writer in northern California.

Get Smart

"If it looks like it's too good to be true, it probably is."

So says Kelly Robinson, bureau chief of financial institutions at the Idaho Department of Finance. In May 1997, his department ordered European National Bank, a fraudulent Internet bank based in Antigua, to cease operations. It did. But not before transferring nearly $5 million in consumer deposits to Russia that have yet to be recovered, according to a Bloomberg News report.

A little research goes a long way in protecting consumers from fraud, says Jeff Kopchik, senior policy analyst at the FDIC. A legitimate Internet bank will post its street address and phone number on its Web site. If you can't find the address, be wary, he says. Also, check the Web address. Secondary addresses like *www.(homepageprovider).com/bank.html* as opposed to *www.bank.com* are an obvious tipoff, he adds.

Still have questions? Check the FDIC's consumer site *(www.FDIC.gov/consumer.html)* or the Office of Thrift Supervision.

Banking on Online Banking

Jupiter Communications predicts near-quadruple growth in online banking from 1997 to 2002:

YEAR	HOUSEHOLDS
1997	4.5M
1998	6.6M
1999	9.2M*
2000	12.4M*
2001	14.9M*
2002	17.1M*

*PROJECTED
SOURCE: JUPITER COMMUNICATIONS INC.,NEW YORK

Online Links

To check out what organizations are doing in Internet banking and securities infrastructure, visit these sites:

Global Trust Enterprise
www.bofa.com/news/news492.html
American Bankers Association
www.aba.com
Investment Company Institute
(mutual funds)
www.ici.org
Securities Industry Association
www.sia.com

A DAY IN OF A PROJE

Have your eye on project management as the next logical career move? For a glimpse at what you can expect, take a look at a day in Scott Farr's life By Melanie Menagh

8 A.M. **SCOTT FARR'S DAY** begins in the conference room for the biweekly year 2000 confab. Farr is project manager for data warehousing at Dartmouth/Hitchcock Medical Center in Lebanon, N.H., a tertiary-care facility and Dartmouth College teaching hospital.

Getting everything to everyone who needs it is a major task, Farr says: "Our job is to figure out the quickest, easiest way to get information about anything — from operating-room costs to results of research trials to news about managed-care changes — to our users, many of whom are not technologically trained. So it has to be user-simple."

Farr's team also manages the medical school and the hospital clinic, which has five outposts in southern New Hampshire. The empire also includes the Hitchcock Alliance, a consortium of smaller hospitals in New Hampshire, Vermont and Massachusetts.

Jokes and the aroma of coffee swirl through the atmosphere as Connie Durham, Y2K coordinator, calls the meeting to order and ticks off items on the to-do list. The conference room hums with commiseration about recalcitrant vendors, suggestions for ways to get users enthused over testing and advice on tracing errant interfaces. Fortunately for Farr, much of his department already works with year 2000-ready technology, so he's here mostly to help unsnarl interface entanglements.

9 A.M. **THE MEETING DONE,** Farr heads back to the hospital, nips into the cafeteria for a cup of java, then moves down the maze of hospital-bright hallways to his section, a central core of cubicles ringed by offices. Farr's digs are pleasant: a view across the lawn to the cafeteria, outdoor scenes on the walls for inspiration, photos of his wife and three sons in decidedly extracurricular surroundings. Oh, yes, and a raft of user manuals, files, reports, trade publications and business books to help untangle current problems and strategize about the three-year plan for the department he's developing.

9:15 A.M. **FARR SETTLES IN** at his desk and checks through the morning "blitzes" (e-mails), answering them in rapid-fire succession. There are requests from users who want reports, forwarded Web addresses for information about ideas for the three-year plan and queries from the financial folks about the latest request for upgrades.

9:40 A.M. **ANYTHING LEFT** unanswered, Farr prioritizes to be addressed later. Farr, who has been at the medical center 18 years, hadn't intended to go into information technology. "Computers were about the furthest thing from my mind," says the 1977 Dartmouth graduate, who majored in math and economics. "A friend was working as a computer operator in a small, local company and got me his job when he left."

After a year, Farr worked his way west waiting tables. But he soon decided to head home, landing a job as a Cobol programmer at a bank in Ver-

PHOTOGRAPHS BY JACK FOLEY

THE LIFE
CT MANAGER

mont. He moved back to Hanover, N.H., to be with his future wife, who was a technician at Dartmouth/Hitchcock. So he signed on, too, working his way up from programmer to project manager.

10:40 A.M. **HIS E-MAILS** answered, Farr wades into the paperwork on his desk.

"Coming up through the ranks was crucial to my understanding what's involved in getting the work done here," he says. "I'm still learning: I've got a Unix class at Dartmouth next week. The politics I've learned more recently as a project manager."

There are nine people on his team. He reports to the CIO and the medical director and sits in on meetings with the CEO and chief financial officer.

There are several ways in which working for a health care facility is unique. "Security is crucial," Farr says. "When someone needs a report, it's done under strict guidelines about what we can release and to whom. We really have two components of customers. The financial and administration: That's the easy part because their data is designed around numerical data. Then there's the clinical side, designed around text-based documents. That's much tougher to manage."

10:50 A.M. **THE PHONE JANGLES.** It's an SOS from one of the medical center's satellite facilities in Springfield, Vt., which is trying to connect with the reporting scheme — but can't. Farr goes into troubleshooting mode, checking through the programs, sniffing for snafus.

11:15 A.M. **FARR TESTS FOR** glitches in the software, running through the many possibilities. Coming up empty, he considers who in his team could best triage the problem.

The office atmosphere is busy but not harried. Though Farr says personnel issues aren't his forte, he's had no one leave in two years. "Other departments have had huge turnover and a hard time finding staff," he says. "Maybe some of it's my style. I try to be flexible about working part time or from home, taking vacations when they want. . . . But I think it's mostly the work. We've developed our own applications, and we deal with different applications across the organization."

He says keeping the staff happy "is a huge priority" for many reasons, not the least of which is the difficulty of luring topflight people to a relatively rural area about two hours northwest of Boston. Then there are the salary constraints posed by belt-tightening in health care.

11:25 A.M. **FARR CALLS IN** Carol Felone, a senior programmer/analyst who handles reports, for a conference call on the Springfield problem. Then he heads down the hall to Ernie LeBlanc's office. Farr wants to get the director of technical services' input on a proposal for a few thousand dollars' worth of Windows NT server hardware, an SAS Institute Inc. database and Kerberos authentication to let business managers check on detailed analyses of rates and revenue.

12:45 A.M. **FARR SPENDS** a good part of his day cruising e-mail.

"I do most of my communicating via blitz," he says. "Otherwise, I like to go to someone and talk to them off the cuff. I do it also with users — just cruise up to the department and ask them how they're doing, if they're doing anything new. That's how I get my tech support: I cruise down the hall, grab a couple of staff and get their ideas." To illustrate his point, he collars Eliot Marcus and Dan Libby, senior programmer/analysts, to get their thoughts on the proposal, listening intently to their advice. He's satisfied that he made the right call on this one.

1:25 P.M. **BACK IN HIS OFFICE** with the Springfield problem still hovering, Farr checks in with the on-call consultant systems administrator, and they finally unravel the mystery: Software must be tweaked to correct the expiration date. While in the neighborhood, Farr checks on the latest e-mails.

3:15 P.M. **ANDREW GETTINGER,** medical director of clinical computing, drops in to discuss the new tech proposal in greater detail. "Communication skills are critical in this job," Farr says. "We want everything we present to look positive — especially when we're asking for money from the VP." For emphasis, he raps on the desk with a wooden back scratcher that, dangling dexterously between his thumb and forefinger, also does duty as a pointer and an eye-to-hand coordination tool.

4:35 P.M. **WITH SALAD** and milk in hand from the cafeteria, Farr heads into the late afternoon with another e-mail check, then starts in on a project: "I work on these projects at the end of the day, when it's quieted down. I still write reports myself."

5:30 P.M. **BY THIS TIME OR 6 P.M.** on a typical day, Farr has usually answered all the emergency e-mails, organized the important ones to answer the next day, prioritized the papers on his desk and is ready for a final cruise around the area to look in on stragglers or to do a security check if he's the last out the door. "The best part of this job," Farr says, "is giving users a quick solution to their info needs. You also get to see the big picture, and that can help direct some of our efforts." ◗

Menagh is a freelance writer in Maple Corner, Vt.

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TIPS FOR THE WEARY TRAVELER

By Steve Alexander

IT travelers can be a hardy bunch: living out of a suitcase, working under strained conditions and constantly on the move. It's not an easy life — unless you know a few tricks of the traveling trade. For those less travel-savvy, we asked some frequent information technology travelers for tips on flying, staying in touch, living in unfamiliar cities, working, maintaining family life, using spare time wisely and dealing with stress.

Air Travel

Reduce Stress

Make travel to and from work sites as easy as possible, says Tim Snyder, president of Productivity Innovations, a Bozeman, Mont., contracting firm. He has spent half of his time on the road for nearly seven years. "I get to the airport early and have a place to go, such as an airport club, to either relax or do work. It brings the stress levels down quite a bit," Snyder says.

He also warns against scheduling flights too close together. "I won't do a connecting flight in under an hour because the chances of not making the connection are growing."

Travel Light

Get yourself some wheels, advises Melinda Resser, associate director of IT at Chicago-based Second Harvest National Food Bank Network, one of the largest charitable hunger-relief organizations in the U.S. She travels approximately half the time as part of an automation project designed to tie together 188 U.S. food banks.

"Have a suitcase with wheels and a computer case on wheels, so you don't have to carry either of them," she says. "Never take a hardcover book, because it weighs too much. Read a paperback, and then pitch it."

> Talk to your clients; they can tell you stuff about their city that no tourist bureau can.
>
> JESSICA STARK, DIRECTOR OF SYSTEMS DEVELOPMENT DECHERT-HAMPE & CO.

Never Check Anything on an Airplane

Lost luggage wastes time, says Bill Goodlett, manager of information resources for the advancing markets group at Brown-Forman Beverages Worldwide in Louisville, Ky. He travels internationally once each quarter for the firm, which produces liquors such as Jack Daniel's Tennessee Whiskey and Korbel California Champagnes. "My luggage has been lost, and I've been several days without any of my things from home," he says. "I can't afford that downtime. So I've learned how to limit my packing to one clothes

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ELLEN WEINSTEIN

TIPS FOR THE WEARY TRAVELER

Continued from page 53

bag and one PC bag."

For those who do check their bags, "never, never put the software in a suitcase that gets checked," Resser says. "I had one episode where a staff member packed the software jewel cases in a suitcase, then the suitcase got ripped open, and the jewel cases fell out."

Staying in Touch

Don't Let Your E-Mail Build Up

"I get about 100 e-mails a day. If I do e-mail while I'm on the road, then it doesn't stack up while I'm gone. Otherwise, I waste a day after I return to the office," says David Richey, director of corporate IT at Lockwood Greene Inc., a Spartanburg, S.C., firm that designs and constructs office buildings and manufacturing plants. He travels at least two days each week to visit some of the company's 28 U.S. offices.

For Snyder, e-mail is in, and the cell phone is out. "I live on e-mail, and I manage to correspond with most of the people I work with that way," he says. "I don't have a pager, and I got rid of my cell phone because I decided I didn't need it, and I was tired of getting ripped off for long-distance charges."

Accommodations and Transportation

Avoid Room Service Like the Plague

Traveling doesn't mean you have to eat poorly, says Tim Gallegos, a former integration manager at Albuquerque, N.M.-based Horizon Healthcare Corp., who traveled approximately three weeks per month for two years. "You'd be surprised how fast you can gain weight [ordering room service]," he says. "I always made it a point to eat out somewhere, and to eat healthy."

Gallegos also says it's a good idea to know where to find important free services, such as suit pressing. "Most major suit retailers offer free suit pressing to anyone walking in wearing a suit," he says.

> I've met a lot of people on airplanes that I've gotten e-mails from later. I enjoy that, and I've met a lot of interesting people.
>
> BILL GOODLETT, MANAGER OF INFORMATION RESOURCES, BROWN-FORMAN BEVERAGES

Eat In

Cooking saves time and money, Resser says. "A group of five of us usually stay at a location one to two weeks at a time, with no weekends home," she says. "So we try to get an efficiency suite so we can cook in the room and don't have to go out every night."

Don't Take the Little Things for Granted

When traveling internationally, it's important to know in advance which hotels have good telephone systems, how well local transportation works and where you can exchange dollars for foreign currency, Goodlett says.

Working Arrangements

Keep It Brief But Busy

"When I go someplace, I go to work. I work 10 to 12 hours a day so that, instead of spending a week, I can spend three days," Snyder says.

Use Hotel Time

Hotel rooms are usually a haven, free of interrupting phone calls, so use them to catch up on work from the office, Richey says.

Work and Fly

Don't waste airplane time, says Jessica Stark, director of systems development at the Kansas City, Mo., office of Dechert-Hampe & Co., a supply-chain, sales and marketing consulting firm in Mission Viejo, Calif. "I don't ever sleep on airplanes; I've gotten into the groove of using the time to work," she says.

ELLEN WEINSTEIN

She travels approximately three weeks per month and says she figures that "if you allow a flight to be dead time, it means more work at some other point in your trip where maybe you don't want to do it."

Snyder disagrees. "I'll work on planes, but I also relax on them," he says. "You don't need to work 100% of the time. Make sure your own personal relaxation is a priority, too."

Stark, always anxious to get her e-mail, is learning which airports have pay phones equipped with connecting jacks for PCs. The Cleveland airport is one of her favorites. "Airports are getting more laptop-friendly," she says.

Family Life

Weekends Sacred

Don't compromise away your weekends, Snyder says. "I miss seeing my wife and my daughters when I travel," he says. "So I have a rule that borders on religion: I'm home on weekends, whatever it takes."

Family on the Road

The people you travel with can form a mini-family, says Stark, who likes to travel with other members of her consulting team. They stay at the same hotel, eat dinner together, work late together and take an interest in one another's activities. "It's a support mechanism that is like a pseudo-family," she says. But she also stays in touch with home. "I try to talk to my husband twice a day when I'm on the road. We talk about mundane things, and it makes where you are feel like home."

Spare Time on the Road

If You Have Time

Snyder goes for modest entertainment. "If I get out of work at about 8 p.m., I eat a little dinner and go to the hotel. Then I like to spend an hour or so reading or watching a movie," he says.

"There is no such thing as downtime in international travel. If you're traveling from here to Hong Kong or Capetown, you pack into that schedule as much as you can get done," Goodlett says.

Stark favors being a tourist when you can. "Talk to your clients; they can tell you stuff about their city that no tourist bureau can," she says. "For instance, in Mexico City, I had a wonderful evening going tamale-hopping, which means buying them from the big oil drums the street vendors cook them in. I got to see the Mexico City that the people who live there like to see."

Managing Stress and Loneliness

Know Yourself

Some people just shouldn't travel, Snyder says. "It is a somewhat solitary lifestyle. If you're not emotionally cut out for travel, don't get into it," he says.

Learn to Be Calm

"Since just about anything is a crisis, you have to be able to calmly deal with it," Stark advises. "At this point, it takes an extreme amount of concentrated pressure and frustration to really unbalance me."

> I'll work on planes, but I also relax on them. Make sure your own personal relaxation is a priority, too.
>
> TIM SNYDER, PRESIDENT, PRODUCTIVITY INNOVATIONS

Get to Know Fellow Travelers

"I've met a lot of people on airplanes that I've gotten e-mails from later. I enjoy that, and I've met a lot of interesting people," Goodlett says.

Stark says that when she's lonely, she cheers herself up by thinking about how interesting her job is. "If I were working for some company based in Kansas City, I wouldn't know what I know now; I wouldn't get to mess with different software applications or deal with different manufacturers," she says. "I wouldn't get to learn about different industries, and I wouldn't have as many different projects to work on. I'm OK with traveling if it means I get to do those things."

But she always comes home on weekends, and she and her husband have no children. "I could not do what I'm doing with children," she says. ◗

Alexander is a freelance writer in Edina, Minn.

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Dear Career Adviser:

I'd like to know how to break past the "geezer" barrier. I have more than 20 years of experience and a bachelor's of science from a top school. I have more than three years' experience in very current and desirable skills, especially Visual C++, Microsoft Foundation Classes, Visual Basic, Java, and HTML. But I'm over 50 and female. I'm not getting any interviews at all. When they say there's a personnel shortage, I curse.

— NOT OVER THE HILL

Dear Ms. Hill:

Although the Internet is based on a 1990s phenomenon, people who are 45, 50 and even older can still be hired at hot technology companies. But realistically, this takes some real doing and a committed action plan.

Remember, most small companies are formed by core teams of MBA classmates who met at school or technologists from larger companies who then broke off to form their own startups. If you're not part of that network, you need to work at developing a solid way in — and not just by sending résumés.

Start hounding professional association meetings where Internet people congregate on a regular basis, get connected to the executive or venture capital teams, or become a valued contractor or vendor who gets hired in-house. Second, observe the nuances. You must have outstanding skills and understand that medium in the same way your younger counterparts do, with the same energy, values and stamina.

While your knowledge will let you hit the ground running, don't hype how much you already know or your managerial skills; you'll scare off a 25-year-old who doesn't want you commandeering his environment. Instead, find a person your own age within that company to whom you can pitch your skills set.

My advice: If necessary, dye your hair, chuck your suits and learn to say "cool," "totally" and "you go, girl!" It will take some doing, but you can have a ball.

Dear Career Adviser:

I recently accepted a technical training position as a Microsoft Certified Trainer. I was given training I didn't need and was asked to sign a lengthy contract as a condition of employment, containing, among other standard provisions, a clause that I would be charged for all training and certification and legally obligated to pay these costs back to the company if I decided to leave the company before a period of two years had elapsed.

Is this unusual? How have these contracts held up in court?

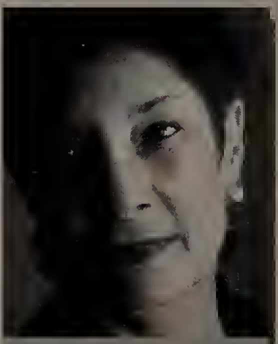
— CONCERNED ABOUT CONTRACTS

Dear Concerned:

Here's information that may help. At Robert Half Inc. Consulting (RHIC) in Menlo Park, Calif., for example, there are some pre- and post-training requirements if you want free training. After 100 hours of service, employees can access a basic program of online courses covering work in Java, Oracle or Microsoft, including certifications. Graduate-level training with both online and classroom training requires 500 hours of prior service plus your agreement to complete 1,000 hours of post-training work with RHIC (*www.rhic.com*) clients.

There may be exceptions in your state that you'll need to check out by consulting an employment attorney on your own.

If the employer provides something of value to an employee, the employer generally appears to have the right to collect repayment if the employee doesn't stay through a certain term.



FRAN QUITTEL is an expert in high-tech careers and recruitment. Send questions to her at www.computerworld.com/career_adviser.

Dear Career Adviser:

I work for a Big 5 management consulting firm as a senior consultant. After 18 months, I'm still trying to find my niche. I'm an IT professional with 12 years of systems development experience (mostly mainframe and some client/server).

My technical skills have been spread thin, and I need to choose a specialty (such as enterprise resource planning, e-commerce and so on).

I have very little management experience, and I'm also uncomfortable managing, but I feel that it's necessary for my advancement. How do I develop new technical skills while continuing to advance in a firm like this without feeling demoted? Which areas of consulting offer the brightest future?

— FLOUNDERING AT A BIG 5

Dear Floundering:

You're right to be concerned. Senior consultant is an entry-level title at a Big 5 firm, and despite your 12 years -- plus the 18 months at your new job — you somehow don't seem plugged into the aggressive nature of the Big 5.

The key to knowing how you're doing is to look at your billable utilization, says San Clemente, Calif.-based Susan Cramm, a former Big 8 senior consultant who's now executive coach and founder of ValueDance in San Clemente, Calif. In other words, if you're billable, you're fine. You get to walk in and say, "I want to do this kind of work. Help me do that." You're put on a high-priority path, whether technical or managerial, because the firms use both.

In fact, a few of the Big 5, like Deloitte & Touche and Ernst & Young LLP, are also creating alternative career paths to partner to retain people who demonstrate technical excellence, motivation and dedication qualities and who also want to take time for family priorities. The immediate task is to see where you stand in this company: Are you a shining star or pigeonholed as second-tier? Then go from there. ▶

WORKSTYLE BRIEFS

What It's Like to Work at . . . Crutchfield

Interviewee: Jeremy Sechler, applications development manager.

Company: Crutchfield Corp., a consumer electronics mail-order house (*www.crutchfield.com*)

Main location: Charlottesville, Va.

IT employees: 25. But a lot of other people's jobs cross over into IT.

Other employees (end users): 500.

Dress code: Anything tasteful. In IT, it's mostly jeans and T-shirts.

Work day: "We have a lot of flexibility. Some people come in at 6 a.m., some at 10:30 a.m. The day ends when the work is done. We work a basic, eight-hour day 75% of the time."

Is a security card needed to get into building or office? No.

How are your cubicles personalized? "Someone has some chili-pepper lights hanging in their cube. One time, someone hung fuzzy dice from the ceiling, and that was funny, but we had to take them down. We had to tone that down a bit.

"Some people have radios, and we use some Crutchfield gear to amplify the signals [because] we're underground."

Computers: "Mostly, we have Pentium II towers with 17-in. monitors."

Must people carry beepers? "At times. We have an on-call rule for after-hours support that rotates."

What percentage of staff telecommutes? "We don't really telecommute. We value the interaction in our group a lot – it's key to accomplishing stuff.

"You have to be able to walk down the hallway and talk to people."

Do you have on-site day care? No.

Where do IT workers go for lunch? "There are a lot of local eateries. Most people get out of the building."

Free refreshments: "Tea, hot chocolate, coffee, apple cider. We dole out free snacks from time to time."

Any other departmental activities? "Once or twice a year, we go out on a departmental boondoggle, like miniature golf. Lately, we're looking at going out for laser tag."

Vending machines: "Coke and snack machines. One has junk food, and one has single-meal items like shrink-wrapped hamburgers."

Cost per soda: 45 cents.

Little perks: "We get employee discounts on the products – something around cost. And we always have an employee of the month company-wide. You get mentioned in the local paper and a reserved parking space for the month."

Would employees feel comfortable e-mailing the CEO? "Yes, a lot of them really do. Bill [Crutchfield, company founder and CEO] has a really good open-door policy. You can walk in and talk to him about anything. The whole executive climate fosters an entrepreneurial spirit. If you have a good idea, you can run with it and make a big difference."

Like what? "I've been trying to push some initiatives toward software engineering processes and some [specification] and review processes. All the IT people are interested in that, in being professional."

Quote: "Some challenges are frustrating. But, by and large, I'm always excited about being here and what I'm doing. We view the other people in the company as our customers, and we try to have strong ties to them. And, we have a great group – we look for well-rounded people, not just coders. We believe a well-balanced employee is a better employee." – *Leslie Goff*

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TECHNOLOGY

USERS: NT 4.0 LOOKING BETTER

Peet's Coffee and Tea adopted Windows NT for its manageability and reliability — two areas where the operating system often gets a bad rap. Peet's move actually makes sense because of improvements in NT and in IT managers' ability to manage it. ▸ **60**

ALLCHIN TALKS MIGRATION

Seeking to defuse fears about how hard it will be to migrate to Windows 2000, Microsoft Senior Vice President Jim Allchin promises online support to help corporate customers find and solve compatibility problems. ▸ **60**

VPNs ON THE CHEAP. . .

Virtual private networks don't have to be million-dollar affairs. Discount shoe retailer DSW chose dial-up, 56K bit/sec. modem connections for sales data and e-mail, rather than more expensive frame relay. ▸ **66**

. . . AND AS REMOTE ACCESS

Construction conglomerate Black & Veatch is ahead of the curve in exploiting VPNs as a cheap way to communicate with its engineers worldwide. For the most part, IT is waiting for the technology and the industry to mature — but sky-high European phone rates make it tempting. ▸ **74**

QUICKSTUDY: JAVA APPLETS

They're no longer mere bells and whistles on a Web page. Today, they bring useful applications to your site. ▸ **72**

LEGACY LIFE SUPPORT

What to do with legacy equipment that won't go away? Two new products could help IT departments bridge the gap between legacy systems and newer environments such as NT and Unix. ▸ **64**

TAKING THE IP PLUNGE

As IP networking gains steam, it will get more expensive to stick with venerable SNA. We talk to one company that's making the conversion, insurer American Mutual, about the hassles and the payoff. ▸ **66**

EMERGING COMPANIES

Start-up WebCriteria has created a virtual site-surfer named Max that attempts to quantify what has traditionally been viewed as a black art: the value of a large Web site. It's a nifty idea, but it may not offer enough control or analysis to suit IT. ▸ **70**

MORE

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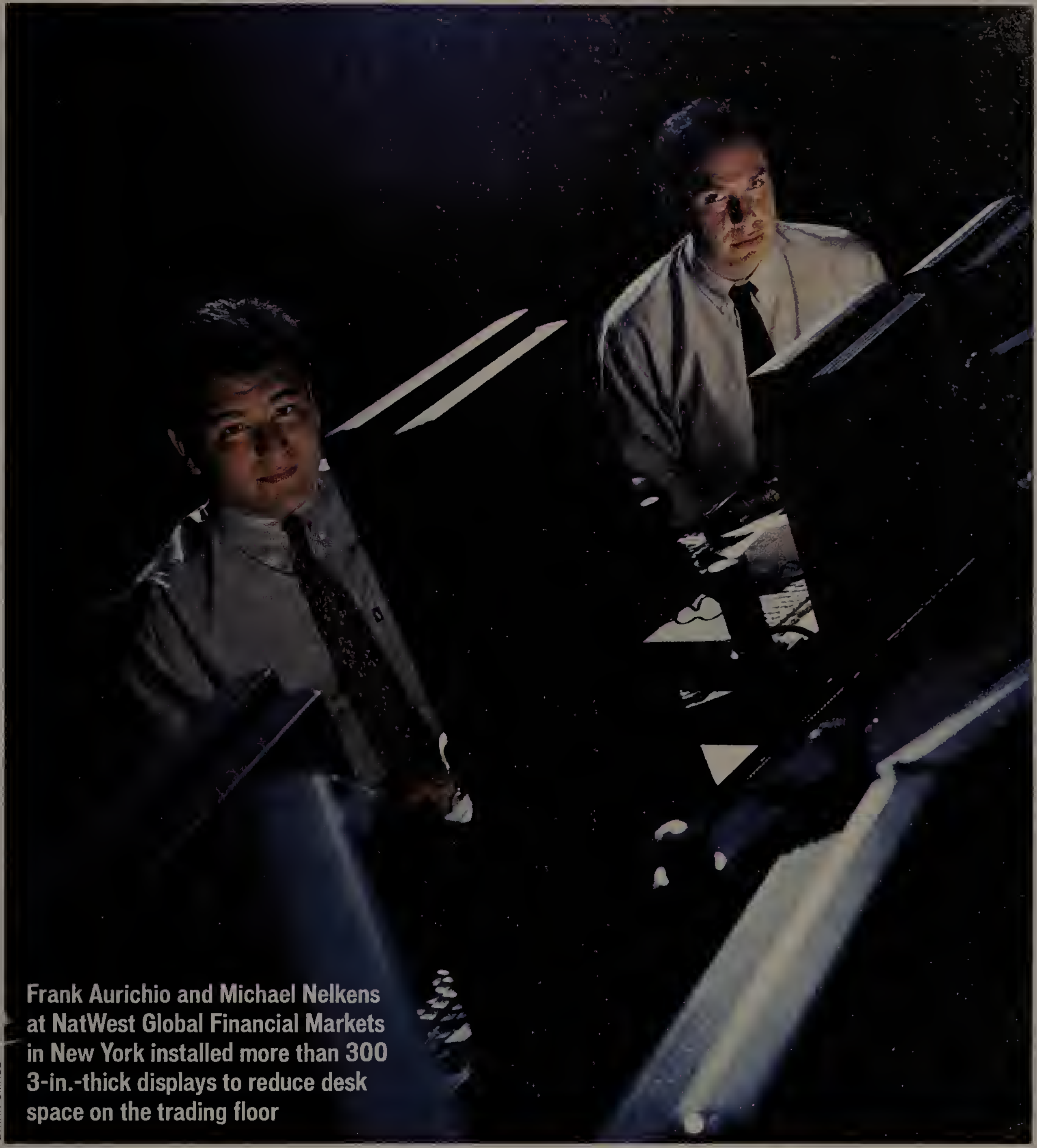


Frank Aurichio and Michael Nelkens at NatWest Global Financial Markets in New York installed more than 300 3-in.-thick displays to reduce desk space on the trading floor

BRIAN SMALE

FLAT PANELS: SEXY, BUT PRICEY

TO TRADERS ON WALL STREET, flat-panel displays offer a way to squeeze more information onto their desks with smaller footprints. They blend efficiency with beauty — but at a cost. Prices have fallen, but not far enough for most general-business users to justify a move to a $1,000 display.

76

BRIEFS

Informatica Tools

This fall, Informatica Corp. will ship PowerConnect for SAP R/3 and PowerConnect for PeopleSoft access tools. PowerConnect for SAP R/3 will provide access to all SAP AG R/3 tables. Using PowerConnect for PeopleSoft, users will be able to access all PeopleSoft Inc. objects. Each package will work with Informatica's PowerCenter. Package pricing will start at $55,000.
www.informatica.com

MQSeries Server Ships for SGI's IRIX

Willow Technology Inc.'s MQSeries server for Silicon Graphics Inc.'s IRIX operating system is available. Willow, in Campbell, Calif., said the server is a fully compliant version of IBM's MQSeries messaging software that enables information exchange between applications. Pricing starts at $7,000.
www.willowtech.com

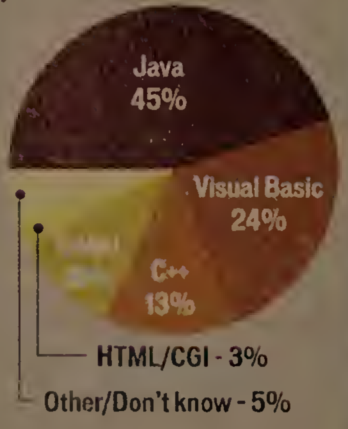
Resumix Tool

Sunnyvale, Calif.-based Resumix Inc. is shipping Resumix Interact for Lawson, software that passes data between Resumix's résumé-tracking systems and Minneapolis-based Lawson Software's human resources package.

Pricing starts at $30,000.
www.resumix.com

Judgment for Java

What programming language do you feel will be used most frequently by corporate programmers in the next three years?



Base: Survey of 107 IT managers at companies with 500 or more employees

SOURCE COMPUTERWORLD IT INTELLIGENCE UNIT, FRAMINGHAM, MASS.

NT 4.0 IS LOOKING BETTER TO CUSTOMERS

Users say improvements in NT — and their knowledge of it — make it more reliable

BY SHARON GAUDIN

Like many companies, Peet's Coffee and Tea has adopted Windows NT 4.0 and moved away from Unix and NetWare.

But unlike many companies, the $60 million, San Francisco-based company chose NT for its reliability and manageability, two areas in which IT managers and analysts have often given NT bad marks.

Systems administrator Pat Blair said Peet's went from zero to 15 NT servers in the past year, dropped Unix and Novell Inc.'s NetWare and switched all of its desktops and point-of-sale machines from Windows 95 and 3.1 to NT 4.0 Workstation.

Concerns about NT 4.0's reliability and manageability are being addressed in Service Pack 4, and information technology itself may have improved at managing it, users said.

"This is so much easier [than Unix or NetWare for me," Blair said. "It's pretty easy to get devices talking to each other and it's easier to get people trained on it. . . . It's not as stable or bulletproof as Unix, but it's easier to get boxes talking to each other on a sophisticated level. And it's actually more stable than Novell's NetWare."

Many Improvements

"NT 4.0 is a much better product than anything else Windows has to offer. And NT 4.0 is much better now than when it first shipped," said Bill Peterson, an analyst at International Data Corp. in Framingham, Mass.

Windows NT has been heavily massaged in the past year or so, improving its scalability, reliability and manageability, according to industry watchers. With the long-anticipated arrival of Windows 2000, hopes are high that those improvements will continue. Windows 2000's Active Directory, which will replace the registry in NT 4.0, was designed to help administrators more easily manage applications, objects and devices. IntelliMirror, another tool, is also expected to ease desktop management. Clustering is expected to greatly boost scalability.

Paul Sundquist, assistant vice president at Marshall & Ilsley Trust Co., a Milwaukee financial institution with $20 billion in assets, said he moved from NetWare to NT and that it's been more reliable for him.

> NT 4.0 is much better now than when it first shipped.
>
> **BILL PETERSON, ANALYST, INTERNATIONAL DATA CORP.**

"There were some learning pains with NT," Sundquist conceded. "There's just a lot to understand in the NT model, but it's working for us. I'm not sure why; I'm just glad it's working."

Steven Sommer, CIO at Hughes Hubbard & Reed LLP, a New York law firm with 60 NT servers, agreed that NT 4.0 has improved, but added that "people don't understand working with [NT] domains. They ended up saying it's hard to administer, but they just didn't know what they were doing." ▶

Allchin Lays Out Win 2000 Migration Path

Pledges more help for Microsoft users

As Microsoft Corp. pushed to get Beta 3 of Windows 2000 out the door late last month, Senior Vice President **Jim Allchin** met with several *Computerworld* editors to discuss the upgrade path customers will face.

Q&A

Q: Can you provide a list for each platform – Windows 95, 98 and NT 4.0 – detailing what will and won't work with Windows 2000?

A: During the install, we walk through everything that's on that system, everything that's in the registry, and we produce a report log. If you have [virtual device drivers], they will not work. [In other cases], it's [software] that a user ... placed on their machine and it's not in our database of information. We try to determine for third-party applications, "Is there a way for us to migrate [the noncompliant software]?" If so, we migrate it.

We're also ... shipping on the [Windows 2000] CD a set of migration DLLs [Dynamic Link Libraries] for Windows 95 or Windows 98 systems. We locate applications that have Windows 95- or 98-specific code [that's incompatible with Windows 2000]. We try to get a DLL from them that will upgrade [the application]. If we don't have the DLL on our CD, we'll point you to an application vendor's Web site that will have the DLL.

We're trying to tell [IT managers] before we just willy-nilly do the upgrade. We're trying to say, "This is what we discovered about your system. You can decide whether you continue or don't. And we leave your machine always in a working situation." That's the thing that's important to us. I'm sure, doing the beta test, we will have some mistakes ... but the goal of the beta test is to ensure that when we finally ship and a customer upgrades, then their system is working when we're done.

MICROSOFT'S JIM ALLCHIN: Migration DLLs will help in Windows 2000 upgrades

Q: But will there be cases in which wiping a system clean and reloading Windows 2000 is best?

A: I think that there will be some. We hope that number is small. We have talked to accounts that say that's what they routinely do, anyway.

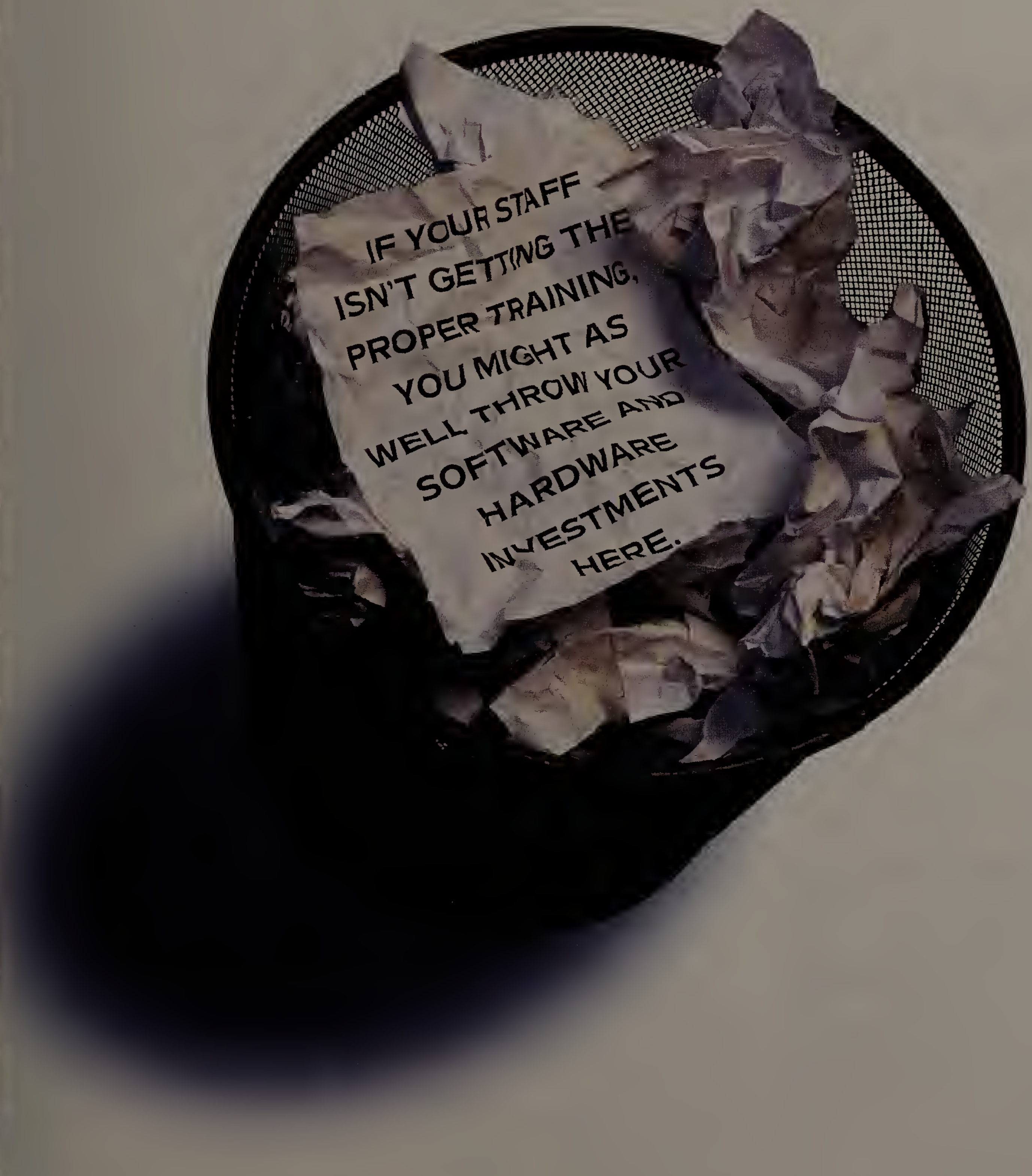
If an IT organization has been very rigid about the type of platform that they have given out to their clients ... they can do [a compatibility test] on a control machine. They can install all the DLLs that they needed for migration by getting them all from third-party Web sites and through something called SysPrep [a Microsoft tool], create a new image of Windows 2000 that then can be used as a deployment vehicle.

Q: What hardware will users need to run Windows 2000?

A: If you're running an NT 4 system and you're happy with the performance and whatever apps you're running, and you upgrade it [to Windows 2000 Professional], you will still be happy with the performance. I'm talking about the client.

Most all the servers [components of NT], in regard to the configuration, are faster. So if you have a file server, a print server, a Web server, you will notice performance increases and additional scalability.

But on the client, if you're happy today with NT 4, then you'll be happy when you move. ▶



According to a Gartner Group study, employees without formal training use less than 25% of their applications. On the other hand, trained users can increase productivity more than 165%. And those numbers can make a big difference next time you need to get a budget approved.

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Q&A Site Offers Customer Service Apps

BY BARB COLE-GOMOLSKI

If you visit the Web sites of Dell Computer Corp. or Toshiba America Inc. looking for technical support, you'll encounter cartoon-like characters who will answer your most vexing product questions. Or will give it a try, anyway.

Dell and Toshiba hope to make their Web support friendlier with technology from Ask Jeeves Inc., a Berkeley, Calif., company that made its name running a question-and-answer Web site (*www.ask.com*).

Though most early adopters of Ask Jeeves use it to handle external support, the software could be adapted to provide internal information technology support, analysts said.

Unlike most search engines, which require key words or Boolean search strings, Ask Jeeves lets users pose queries in plain English. "This may help humanize Web-based support," said Dan Ludwick, Toshiba's marketing director for services and support.

Toshiba said it can save money by directing people to its Web site for support rather than fielding phone calls.

When a user types in a question, the Ask Jeeves engine breaks it into pieces based on grammar and the meaning of the words. The question is then matched against templates stored in the Ask Jeeves knowledgebase, a warehouse of all queries that have been correctly answered in the past. Finally, Ask Jeeves maps the question template to the location of the correct answer, whether it resides on a corporate site or on the Web.

Limitations Crop Up

The system is easy to use but has limitations, analysts said. "It lends itself to questions that are relatively simple," said Steve Robins, an analyst at The Yankee Group in Boston. For instance, when asked, "Where can I get information on training classes for Lotus Notes? Ask Jeeves returned several relevant choices, including training programs and support information from Lotus Development Corp. But when asked, "How many U.S. students graduated in 1998 with degrees in computer science?" its answers were off the mark. It offered a list of classes taught over the Internet, salaries for jobs in the computer industry — even ways to find the people one went to school with.

At Toshiba, the service — which is dubbed Ask Iris — handles "basic sales and marketing questions and takes users to other places on the site," Ludwick said. That capability took about three months to set up, and Toshiba already had the knowledge stored in a relational database. The bulk of the work was in lining up that information with Ask Jeeves' templates, he said.

Pricing for Ask Jeeves varies, but the company said average implementations cost between $300,000 and $1 million. ▶

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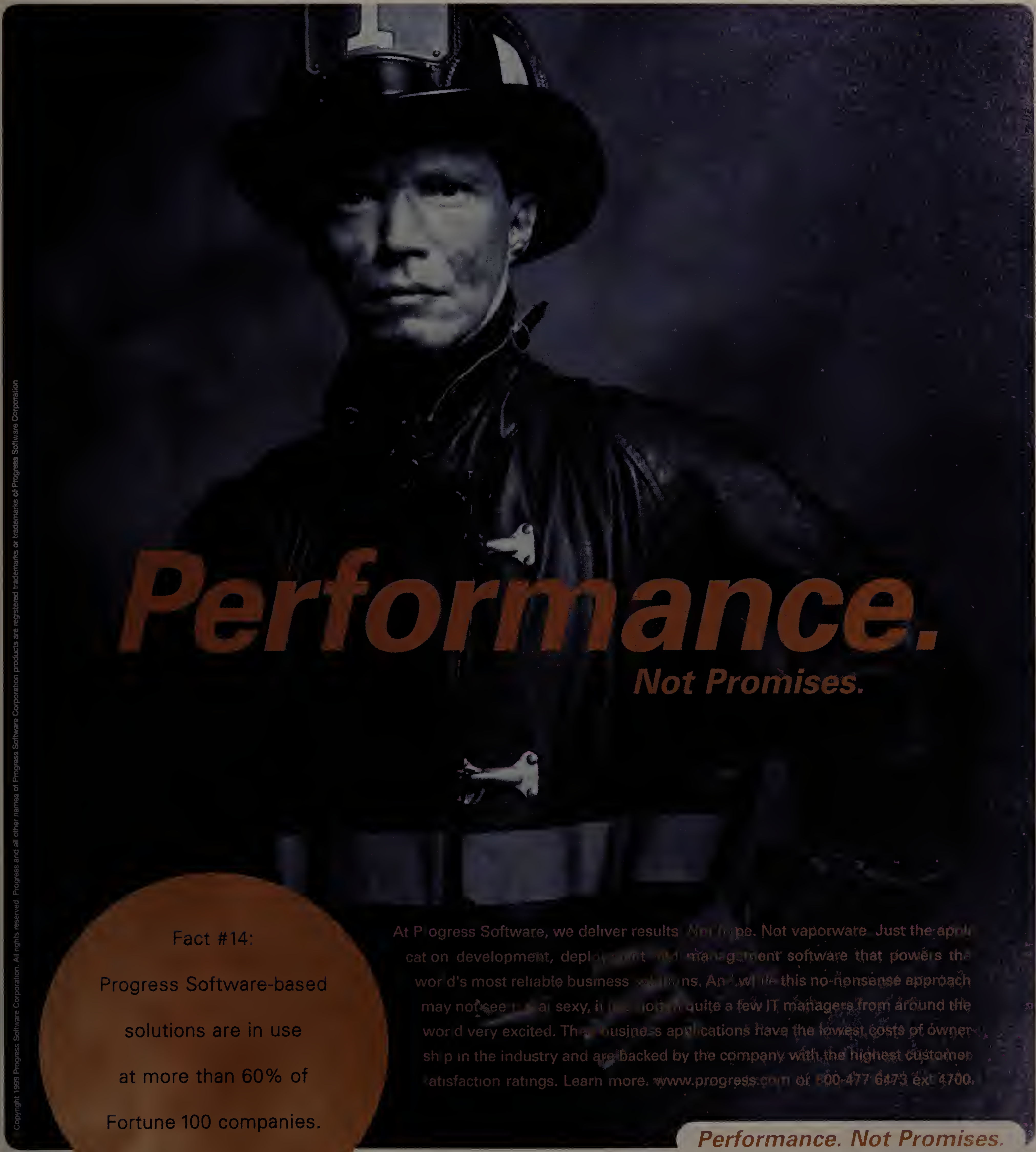

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BRIEFS

New Celeron to Bow

Intel Corp. last week announced a 466-MHz version of its Celeron processor and said a new chip set will follow next month. The 810DC100 chip set was designed for high-end computing and can support 4M bytes of optional display cache, Intel said. Several PC vendors – including Hewlett-Packard Co., Dell Computer Corp., Compaq Computer Corp. and IBM – have announced plans to ship systems using the 466-MHz Celeron.

Compaq Adds to Deskpro Line

Houston-based Compaq Computer Corp. has added three desktop models to its line of Deskpro Series PCs. One Deskpro EP model offers a 400-MHz Pentium II processor from Intel, 32M bytes of RAM and a 4.3G-byte hard drive. A second Deskpro EP model features a 500-MHz Pentium III, 64M bytes of RAM and a 10G-byte hard drive. The Deskpro EN provides a 500-MHz Pentium III, 64M bytes of RAM, a 10G-byte hard drive and a network interface card.

Pricing for the systems ranges from $1,369 to $2,249.

www.compaq.com

RAID Software for NT

NStor Technologies Inc. has announced the AdaptiveRAID Kit, software for Windows NT bundled with a 64-bit host bus adapter. The kit was designed to bring high-end RAID functionality to the entry-level and midsize server market, according to the Lake Mary, Fla., company.

Pricing ranges from $1,089 to $1,319.

www.nstor.com

Worldwide PC Shipments:

1998	1999
88.4 million	103.2 million*

*Projected

SOURCE: INTERNATIONAL DATA CORP., FRAMINGHAM, MASS.

BREATHING NEW LIFE INTO OLDER SYSTEMS

Vendors offer products to bridge gaps among legacy systems and Unix, NT

BY STACY COLLETT

WHAT DO YOU do with legacy equipment that refuses to go away?

Life-cycle extension products are helping information technology departments keep legacy systems on life support while migrating to new environments such as Windows NT. But industry observers predicted such extension devices will have short life spans.

Perle Specialix Inc., for example, has just released a terminal/remote access server and LAN hub that connects Unix and Windows NT environments across IP-based LANs and WANs. The device also helps companies move from heavily serial to mixed serial and LAN-based environments. Other companies develop their own, in-house integrated server systems.

"There have been a lot of people trying to tackle that problem," said Jim Slaby, an analyst at Cambridge, Mass.-based Giga Information Group Inc. "In the retail environment, it's the old point-of-sale equipment [that remains]. In branch banking, it's ATMs. Many of them are still running IBM's networking protocol from the late '60s."

Perle's Lanstream 2000 supports mixed environments of both serial and PC devices. The product is available in 16-serial and eight-hub port or eight-serial and 16-hub port versions. Pricing starts at $1,695. The Jetstream 4000, which costs $1,095, is a compact, 16- or 24-port terminal server that connects a larger range of serial devices to a Unix or NT host. Both products come with software that enables remote management and configuration via the Web.

Industry watchers said the products work for companies that don't have the capability to rewrite code or the money to replace systems.

"The problem is it's potentially a short-lived segment. How long does it take for people to kill these apps off? Five to 10 years? What do they do after the rest of the world is rewritten on Java or Microsoft [standards]?" asked Scott Lundstrom, vice president of technical research at AMR Research Inc. in Boston.

But potential users are optimistic. "The idea of [such a] device is wonderful," said John Thompson, vice president of technology at Sales Mark Inc., a Plano, Texas-based food brokerage firm. "The issue will be, What specific problems can it solve?" ▶

Qualcomm Combines Palm Platform, Cell Phone

Some say devices are not quite ready for IT

BY MATT HAMBLEN

Qualcomm Inc. plans to ship its new line of pdQ smart phones some time this summer, but analysts said it's unclear how quickly the workplace will adopt such handhelds.

The pdQ device sounds like a dream to technology-savvy executives who want a combined cellular digital telephone and personal digital assistant (PDA) based on the Palm operating system from Palm Computing Inc., a division of 3Com Corp. in Santa Clara, Calif. That combination will give users voice and data transmission capability, wireless Internet and e-mail access and and a personal organizer — all in a 10-oz. package.

But gaps in digital wireless service, questionable security and a dearth of applications are seen as slowing the devices' corporate acceptance.

"The pdQ interests me on a personal level and for a couple of managers who want a lot in one device," said Jim Vannette, chairman of Holland Special Delivery, a delivery service in Holland, Mich. Vannette recently tested the pdQ at the Mobile & PDA Expo in Chicago.

San Diego-based Qualcomm has been vague about the pdQ's pricing, saying only that it will run from $500 to $1,000, depending on the service provider. Vannette said the device would be "worth it" because it would eliminate the need to buy a separate Palm device. "Unfortunately, we don't have digital wireless network service in our area yet," he added.

Digital wireless service gaps will be a problem for all smart-phone makers, slowing the devices' adoption among corporate users, analysts said. Smart-phone makers seem to be marketing mostly to consumers so far, bypassing corporate information technology managers, they said.

"It will be a while before there's enterprise connectivity with smart phones," predicted Jill House, an analyst at International Data Corp. in Framingham, Mass. In addition to cellular network gaps, companies will find "there are not the software applications and the firewalls available to make smart phones compelling," she said. The pdQ is the first smart phone to implement the popular Palm operating system, which should give it more market momentum than similar devices, House said. ▶

▲ **QUALCOMM'S CDMA Digital pdQ smart phone**

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SHOE CHAIN LIKES FIT OF DIAL-UP FOR ITS VPN

56K bit/sec. connections move sales data, e-mail more cheaply than frame relay

BY BOB WALLACE

After passing on more expensive, frame-relay wide-area network services, DSW Shoe Warehouse replaced the rudimentary system it uses to poll stores for sales data with a relatively inexpensive dial-up virtual private network (VPN).

The VPN, which uses AT&T Corp.'s Internet backbone, will be far cheaper, faster and more secure than using what had largely been 9.6K bit/sec. dial-up connections to DSW's 50 stores nationwide.

Nonstop Availability

"What we're creating is a pseudo wide-area network that's available around the clock for our stores," said Fred Bunell, MIS director at the shoe retailer's parent company, Shonac Corp. in Columbus, Ohio. "It's very inexpensive, offers a great degree of flexibility and provides a foundation for us to deploy new systems for our stores."

Using a VPN based on one Internet service provider's backbone is a popular approach, but it's less common to move directly from simple polling to using a VPN for real-time communications and applications such as e-mail, according to Tom Nolle, president of CIMI Corp., a consultancy in Voorhees, N.J.

Nolle said DSW's approach is a relatively inexpensive way for customers to make such a move. It's also flexible because individual stores can use leased lines to the network if their transmission needs increase, he said.

Bunell said he considered a frame-relay network and a dial-up frame-relay network. The former would have provided guaranteed speeds of 56K to 64K bit/sec. but would have cost $25,000 to $30,000 per month. A dial-up frame-relay network would have cost $13,000 to $15,000 per month.

The VPN implementation that was selected by DSW offers speeds of 56K bit/sec. at best but costs only $1,200 to $1,500 per month.

TED RICE

SHONAC CORP.'S FRED BUNELL: The DSW dial-up VPN "provides a foundation for us to deploy new systems for our stores"

The company considered building a VPN using the services of multiple Internet service providers, but Bunell wanted one that offered points of presence, or entry points to the backbone, close to each DSW store.

"A single [Internet service provider] providing a VPN on its own infrastructure can provide service-quality assurances, whereas all you get is best-effort performance with the Internet," Nolle said.

But customers can still be subject to problems on the backbone such as congestion and security, he added.

With the VPN, a DSW employee is first authenticated against a list in a special server running at a DSW location. If the user is approved, a 56K bit/sec. modem connects him to the closest AT&T entry point.

Then a 3Com Corp. router at the DSW site establishes a tunnel to the destination and applies 128K bit/sec. encryption to the data for transmission. That data is then decrypted by the router at the receiving site.

Once the VPN is completed — three of the network's sites are already up — DSW stores will be able to communicate with headquarters online in real time, allowing e-mail to replace heavy faxing and phone calls to headquarters, Bunell said. ◗

Report Urges Switch From SNA to IP Nets

Stragglers may miss Web opportunities

BY JAIKUMAR VIJAYAN

Corporations that stick with SNA networks as their primary access to legacy data will soon be spending more money and deriving fewer benefits than those using consolidated networks based on IP, according to a recent Gartner Group Inc. report.

And the longer the integration is put off, the greater the total cost of ownership of SNA networks will be because of falling product support and skills availability, said Audrey Apfel, author of the Gartner report.

There's also a greater chance of missing Internet-related business opportunities that can be exploited only via IP networks, she added.

"Web-based features and functionality will continue to be built and centered around IP," said Steven A. Clemens, director of network technologies at American Family Mutual Insurance Co. in Madison, Wis.

Despite those reasons to switch, SNA-based shops have moved slowly to IP because of performance concerns and a reluctance to walk away from SNA-related investments in technical skills, business processes, applications and vendor relationships.

Fewer than 50% of mainframe shops that had SNA networks in 1990 now have consolidated networks, according to Gartner.

American Mutual is in the midst of an SNA-to-IP conversion involving more than 3,200 sales offices, 8,500 workstations and more than 6,500 users in 70 corporate offices. Much of that migration is being driven by the greater vendor support and product choices — both of which promise lower costs.

SNA networks, which grew out of mainframe technology, were until recently considered far more reliable and robust than client/server-based IP networks. SNA's low-bandwidth requirements and guaranteed service levels were ideal for transaction-intensive networks such as those for banking and reservation systems. Concerns that much of that would be lost in a switch to IP has delayed a mass migration — as has the potential hassles involved.

A case in point: American Mutual's conversion forced the company to change all mainframe-access terminals and emulation technologies, Clemens said. All desktop 3270 emulation is being converted from Advanced-Peer-to-Peer Networking (APPN) technology to TN3270.

But new technologies are letting customers layer SNA-like capabilities — such as traffic and bandwidth prioritization — on top of IP networks, said Gary Weaver, network communications manager at Smurfit-Stone Container Corp. in Chicago.

Other Options

Vendors such as Cisco Systems Inc. and Nortel Networks Inc. subsidiary Bay Networks Inc. offer products that allow customers to run SNA on top of IP networks.

Other technologies, such as Frame Relay Access Services, APPN, Data Link Switching and TN3270, allow SNA traffic to be sent over IP networks both natively and in encapsulated form.

Those advances not only close the performance gap, but also provide many of the bandwidth reservation, traffic prioritization and management capabilities of SNA, Apfel said. ◗

JUST THE FACTS

Three Good Reasons

Why companies should consolidate SNA networks into IP-based networks.

SNA networks will become increasingly costly to own.

SNA skills, management tools and applications will become harder to find.

New Internet-driven business opportunities can be addressed only via IP.

SOURCE: GARTNER GROUP, STAMFORD, CONN.

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IDG

NOTEBOOK EXTREMES

Hefty or thin, the choice is yours. Key battles in notebook market are happening at opposite ends of spectrum. Page 81

THAT'S THE WAY IT WAS

How technology helped newsman Walter Cronkite predict a landslide in the 1952 presidential election. Page 86

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Y2K MAY STALL WINDOWS 2000

Analysts pessimistic; many expect mid-2000 shipment for Microsoft operating system

BY SHARON GAUDIN

A growing number of analysts are warning users not to expect delivery of Windows 2000 before the middle of next year.

That's at least six months after the delivery date pinpointed last week by Ed Muth, Microsoft Corp.'s group product manager for Windows NT. And the delivery date Muth targeted in his statement — which came on the heels of a confirmed one-month delay in the release of the third beta of the updated operating system — is later than what Microsoft had predicted. In a statement last year, it pegged mid-1999 for the final release of Windows 2000.

Aside from any Microsoft issues, the major culprit behind analysts' prediction of a delay is the year 2000 problem and related system freezes that are expected to go into effect in the second and third quarters at many user companies.

"Based on Microsoft's history and the events coming up this year, like Y2K, I don't see them coming out

Windows 2000, page 16

JUST THE FACTS

Ripple Effect

Applications that could be affected by a Windows 2000 delay:

- Office 2000
- The BackOffice suite, including updates for:
  - SQL Server
  - Exchange Server
  - BackOffice Server

PORTALS LINK BUYERS, SELLERS

Web marketplaces cut costs, speed purchasing

BY CAROL SLIWA AND SHARON MACHLIS

Got cows?

Business users can now buy everything, be it cows, chemicals, electronic parts or paper, through Web portals designed to help them find goods and compare suppliers' prices in specific vertical industries.

Users say this emerging business-to-business purchase process will make transactions faster, simpler and potentially more cost effective.

Take electronics components. Robert Child, director of corporate purchasing at EFTC Corp., an 1,800-employee electronics maker in Denver, said it might take two or three days and 10 or 20 calls just to locate

Portals, page 16

CHRIS PIO[illegible], a deputy CIO for the city of Indianapolis, says you need to be a tough bargainer and fight for continuous improvement.

NO PANACEA

HELP DESK OUTSOURCING

Farming out the headaches of the help desk to a contractor is a fast-growing trend — and it seems like such a great idea. But as national correspondent Julia King reports, CIOs are learning that a bad outsourcing deal just creates an endless loop of finger-pointing and frustrated users who can't get their technical problems solved. The upshot: Some companies are dumping their outsourcer for poor performance, bringing the help desk back in-house or renegotiating the contract to get service-level agreements.

As one analyst put it, "Broken help desk processes and problems aren't going to be magically fixed by outsourcing." *See page 24.*

COMPAQ NEEDS ENTERPRISE VISION

Hurdles: User retention, product integration

BY JAIKUMAR VIJAYAN AND APRIL JACOBS

It has talked the talk. But can it walk the walk?

One year after stunning the industry with its bid to buy Digital Equipment Corp. — and seven months after the deal went through — Compaq Computer Corp. has made great strides in its bid to be perceived as an enterprise player. But that hasn't meant security for the company's enterprise users.

Compaq has promised users that it will make OpenVMS, Alpha and Digital Unix its high-end platforms of choice. But the Wintel-centric company — which purchased Digital primarily for its service capabilities — has yet to explain how it plans to do that while integrating its now broad family of technologies into a long-term enterprise strategy.

Compaq, page 103

COMPAQ CEO Eckhard Pfeiffer could be in trouble, analysts say, if product revenue slows down. Quarterly results are expected this week

NEWSPAPER

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*Publisher's own data as of 1/18/99.

BRIEFS

Viking USB Modem Is Hot-Swappable

Viking Components Inc. is shipping the Viking 56K USB Modem, a Universal Serial Bus (USB) modem for PCs and Macintosh systems. The external modem lets users access servers and Internet server providers that support the V.90 or K56flex standards, according to the Rancho Santa Margarita, Calif., company. It's hot-swappable so users can switch it with another USB device without powering down.

The modem costs $119.99.

www.vikingcomponents.com

Linksys Adds Modem Card for Notebooks

The Linksys Group Inc. has released the Linksys EtherFast 10/100 + 56K Modem PC Card for notebook users. The 16-bit PC Card requires one PC Card Type II slot or one 32-bit CardBus slot, according to the Irvine, Calif., company. Users can run LAN and fax/modem functions simultaneously.

The PC Card costs $189.99.

www.linksys.com

Token Ring-Ethernet Adapter Announced

ZNYX Corp. has announced a multiprotocol network adapter that lets workstations on Token Ring and Ethernet networks share the same servers. Called NetBlaster ZX361-ISL, the 100M bit/sec. network adapter works with Cisco Systems Inc. Catalyst switches and supports both Token Ring and Ethernet simultaneously.

The adapter costs $799.

www.znyx.com

NetReality WAN Management Tool

In June, NetReality Inc. will ship WiseWan 3.0, enhanced bandwidth-management software for wide-area networks. The software now supports inverse multiplexing, which lets users "glue" up to four T1 lines together for greater bandwidth, according to the Santa Clara, Calif., company.

Pricing starts at $2,495 per link.

www.net-reality.com

Products Offer Automated Security

Network Associates Inc. in Santa Clara, Calif., has announced new releases of three security products: Gauntlet Firewall 5.0, Cybercop 5.0 and PGP VPN 6.5.

The releases include what the company called a new approach to automating enterprise security. The strategy, called Active Security, includes new technology from Network Associates and a series of partnerships with companies that include Microsoft Corp., Hewlett-Packard Co., Entrust Technologies Inc. and VeriSign Inc.

A secure communication coordinator, called Event Orchestrator, links Network Associates' security products with partner technologies to share information across a network and react in real time to security breaches.

www.nai.com

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WEB AGENT TAKES SITE EVALUATION TO THE MAX

WebCriteria tool simulates human activity to compile best — and worst — site traits

BY CYNTHIA MORGAN

ALTHOUGH he's limited to a 28.8K bit/sec. modem with standard browser and plug-ins, "Max" doesn't waste time wishing for a high-speed Internet connection. He's dedicated to finding information on your company's Web site, and he won't stop looking until he finds it. An experienced Web surfer, he'll relentlessly click through link after link — but is very good at finding the shortest path to his goals.

Max is your typical Web site visitor in every respect except one: He doesn't exist.

Max is the creation of WebCriteria Inc., a Portland, Ore., start-up that's attempting to quantify what many Web experts consider unquantifiable: the usefulness of a large Web site. Max, a software simulation of human browsing behavior that WebCriteria CEO and President Alistair Williamson calls a "calibrated customer," can surf a Web site in the same way and return hard numbers detailing what a real customer experiences on a site.

The result? A standard for measuring the usability of a Web site against similar ones. It's a potentially powerful tool for gaining an edge over competitive sites and in helping administrators decide when they have an infrastructure problem and when it's time to bring in the Web-design crew.

Studies show again and again that users who can't quickly find what they need in a Web site will leave and probably won't come back.

Conventional wisdom holds that true Web site performance can't be measured for several reasons. For one thing, today's personalized Web sites have no real static existence; they're built on the fly for each visitor and change accordingly. For another, wild fluctuations in Internet performance make it difficult to determine if slow navigation is caused by poor site design or Web delays.

Largely uncontrollable factors will manage the speed of a user's day-to-day Web experience, independent of the site design. WebCriteria solves that problem by isolating the Web site and testing it off-line. The company first sends its "spider" — a software agent that enters a Web site, follows links and gathers information about each page — to gather what Williamson calls a "serving-size" portion of the site. Ranging from about 200 to 600 page views, it's what WebCriteria's experts say a visitor would see in up to 10 hours of browsing.

The spider's data gathering is used to create a model of the site on WebCriteria's servers. Once created, Max enters the site and compares its experience with the best and the worst for that type of site.

WebCriteria's chief moneymaker, its SiteProfile reports, compare a client's Web site with the best and worst in that customer's industry. Customers can buy reports online, specifying one or two competitors for in-depth comparisons. SiteProfile can also include benchmarks for the client's industry. Williamson says his researchers have put together about 20 industry benchmark packages and will have 40 online this summer.

Questions Answered

The reports answer the following questions for the client site and its competitors, assigning numeric ratings to each for comparison purposes:

■ Speed. What's the response time for the average user request? How quickly does a page load? How long does it take to traverse the links required to reach a particular page? How will those scores vary with low-bandwidth access devices such as modems?

■ Accessibility. How easy is it to quickly navigate the site? How many choices appear on the page? How much content do users need to read before making choices? How many clicks does it take to reach a goal by the shortest path?

■ Refresh rate. How often is the site updated? Are graphics, audio and other multimedia frequently refreshed or are updates confined to text?

■ Composition. What impression will the average surfer gain when he browses the site? What types of files are found on the average Web page? Are they text-only, which can be tedious to browse, or graphics and Java applets, which can take time to download? How long does it take to view each?

Max will soon have cousins. "Max, right now, is the equivalent of someone who's been on the Web for a year," Williamson said. "But a site actually feels different to different types of users. A teen doesn't read to the bottom of the page or go more than three pages into a site; a senior citizen does. What we're trying to do is create 'calibrated persons' who can tell us exactly how specific groups will view a Web site."

Williamson said the company has no plans to sell a packaged benchmarking tool, mostly because of the potential for overloading Web servers with data-hungry spiders.

"We initially considered selling our software," he added. "But while it's fine for one company to spider a site, what happens if 100 companies use our software to spider Amazon.com in the same week?" ◗

BRIAN DRAKE

WEBCRITERIA'S ALISTAIR WILLIAMSON: Gauging a site's usability is the goal

DOSSIER

WebCriteria Inc.

Location:
1326 SW 21st Ave.
Portland, Ore. 97201

Phone: (503) 225-2991

Web address: *www.webcriteria.com*

Niche: WebCriteria offers information technology managers a hard-numbers rating system for Web-site performance and ease of use.

Company officers: Alistair Williamson, CEO and president; Chris Tilt, chief technology officer and vice president of engineering; Bruce Carocci, vice president of marketing and sales; Stephen Leasia, general counsel; Pat Huber, chief financial officer; Rex Ferbrache, learned adviser

Milestones: Company founded in 1998; SiteProfile released in March 1999

Employees: Seven, plus several contractors – and hiring

Profitability: "Too early to discuss," Williamson said.

Burn money: Venture capital from Shaw Venture Partners LLC and private investors, including Steven McGeady, vice president of Intel Corp.'s Content Group

Customers: CyberSight, E-Vineyards

Cost: Single site profile, $495; QuadPac (four reports in 12 months), $1,195; MasterPac (10 reports in 12 months), $1,950. The company will also sell service subscriptions that track an industry's leading Web sites for a year at prices ranging from $4,000 to $10,000.

Potential stumbling blocks:

It's not for do-it-yourselfers. WebCriteria sells reports, not tools to build reports. That could be a problem for IT managers who want interactive control.

It's not psychic. WebCriteria reports give hard numbers. Administrators must decide for themselves what those numbers mean.

Your mileage may vary. WebCriteria can point out problems with site design. You will still need to diagnose and solve problems relating to network infrastructure.

THE BUZZ

A Customer's Feedback

CyberSight Inc.
Portland, Ore.
www.cybersight.com

CyberSight has built online strategies for companies like AT&T Corp., Visa International Inc., Microsoft Corp. and Molson Breweries Inc. Bob Treuber, vice president for client services at Molson, said the company so far has ordered WebCriteria reports for Molson and its own internal sites.

Does it Work?

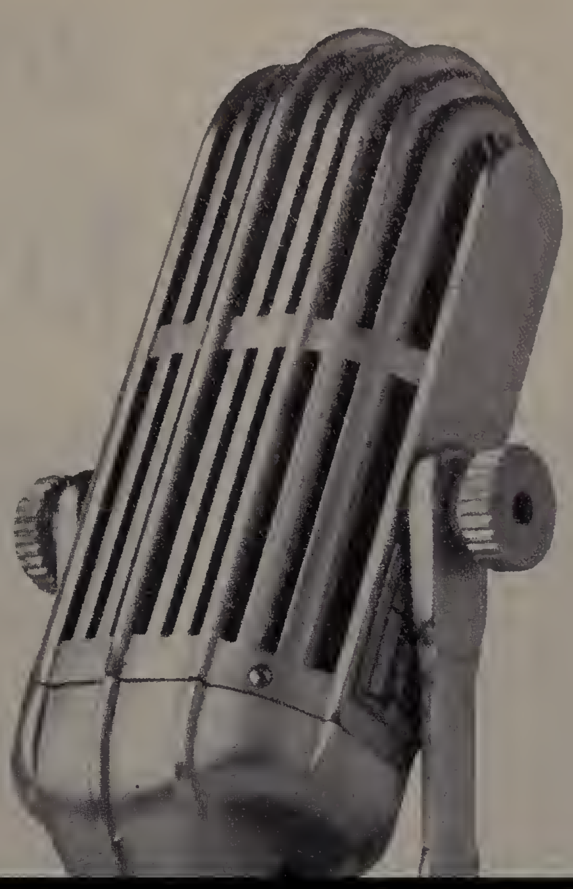
"It helps you prioritize, working according to a competitive strategy. We ran a report on Molson comparing it to sites owned by Budweiser, Labatts and a prominent entertainment company and found that in some areas we were already very competitive. In others we weren't. So we knew right away where we should be concentrating our efforts," Treuber said.

"Most IT guys say, 'Video? Audio? Rich media? Arrrrgh!' They're looking at it purely from a size perspective. But a user may think the trade-off – waiting 30 seconds to get a video clip – is worth it. If you can show that your competitor has this stuff, it makes a stronger case for your site," he said.

Red Flags

"There are no hard-and-fast rules as to what's good and what's bad," Treuber said. "If I'm looking up a term on whatis.com, I want the answer in a few seconds. If I'm going to MSNBC.com, I might expect to be on the same page for several minutes. Both are desired results; you must know how to use WebCriteria to determine if your particular results are good or bad."

– Cynthia Morgan



In a developing story, IDG.net and CNN.com have been linked in a technology information coup.

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Java Applets

DEFINITION

A Java applet is a small application written in the Java programming language and used in Web pages. It can make a site more interactive by adding animation like a waving American flag or provide a business use like a spreadsheet tool.

BY CARLA CATALANO

JAVA APPLETS are little applications that can breathe life into an otherwise lifeless Web page. Java is more powerful than straight HTML, the language used to create Web documents. A Java applet makes things happen on the Web page, unlike HTML, which uses displayed text boxes and fields but isn't heavily interactive.

When Java applets first hit the market three years ago, they were really hot because you could add cool animation to your Web site, says Anne Thomas, an analyst at Patricia Seybold Group in Boston. People were using applets to add animation to their pages just for fun, she says. Today, people are less inclined to add animation unless it's the focus of their Web page — like a Nasdaq Inc. banner floating across the page or a twirling view of a catalog product — because it takes a long time for end users to download an applet.

But once its loaded, response time is pretty quick, Thomas says. Plus, the fanfare over animation is gone for most people, she adds; they now use Java applets to provide critical information, not bells and whistles.

A Java applet is like "a little Windows application running inside your Web browser," Thomas says. People use the mini-applications to bring to a Web page windowing capabilities like a spreadsheet tool or utility functions such as a calculator to make their Web sites more interesting and interactive, she says.

The end user doesn't need to have technical knowledge to run an applet, says Sally Cusack, an analyst at International Data Corp. in Framingham, Mass. In fact, because Java applets work behind the scenes, the user often doesn't know he's using an applet — he just knows the job is getting done.

"Almost any program that can be written in Java can be written as an applet," Thomas says. That means you can execute your internal application systems from a Web browser anywhere in the world, she says. For example, if your order-entry system runs on Windows, you can build the user interface in Java and run it from any machine.

The Java applet's cross-platform capabilities may be its biggest strength, Cusack says. Java applets can run on any Java-compatible Web browser. That's important because the browser is the "universal common denominator" when it comes to downloading from the Web, Cusack says. "That portability makes using Java applets virtually worry-free in terms of technology," she adds.

Java applets provide more functionality than HTML, but they're no longer regarded as silver bullets, Cusack says. "Applets can clog the network pipes because they provide more real estate than you need," she says.

The bottom line: Use Java applets when you need a richer, more graphical user interface, says Mike Gilpin, vice president at Giga Information Group Inc. in Cambridge, Mass. Otherwise, stick with HTML; it's thinner, lighter and faster than the Java applet, he says. ◗

Catalano is a freelance writer in Holliston, Mass.

Are there technologies or issues you would like to learn about in QuickStudy? Please send your ideas to QuickStudy editor Stefanie McCann at stefanie_mccann@computerworld.com.

MOREONLINE

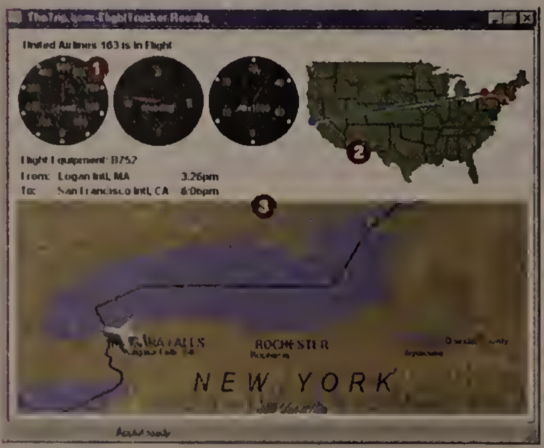
For more information about Java applets, visit our Web site.

www.computerworld.com/more

AT A GLANCE

Java in Flight

Here's an example of a Java applet that lets you track a plane in flight. Go to: www.thetrip.com/flightstatus/graphical/bin/majorair. html. *Plug in the airline and flight number; the Java applet will launch, and you'll get this window which shows:*



United Airlines 163 is in Flight

Flight Equipment: B752
From: Logan Intl, MA 3:26pm
To: San Francisco Intl, CA 6:06pm

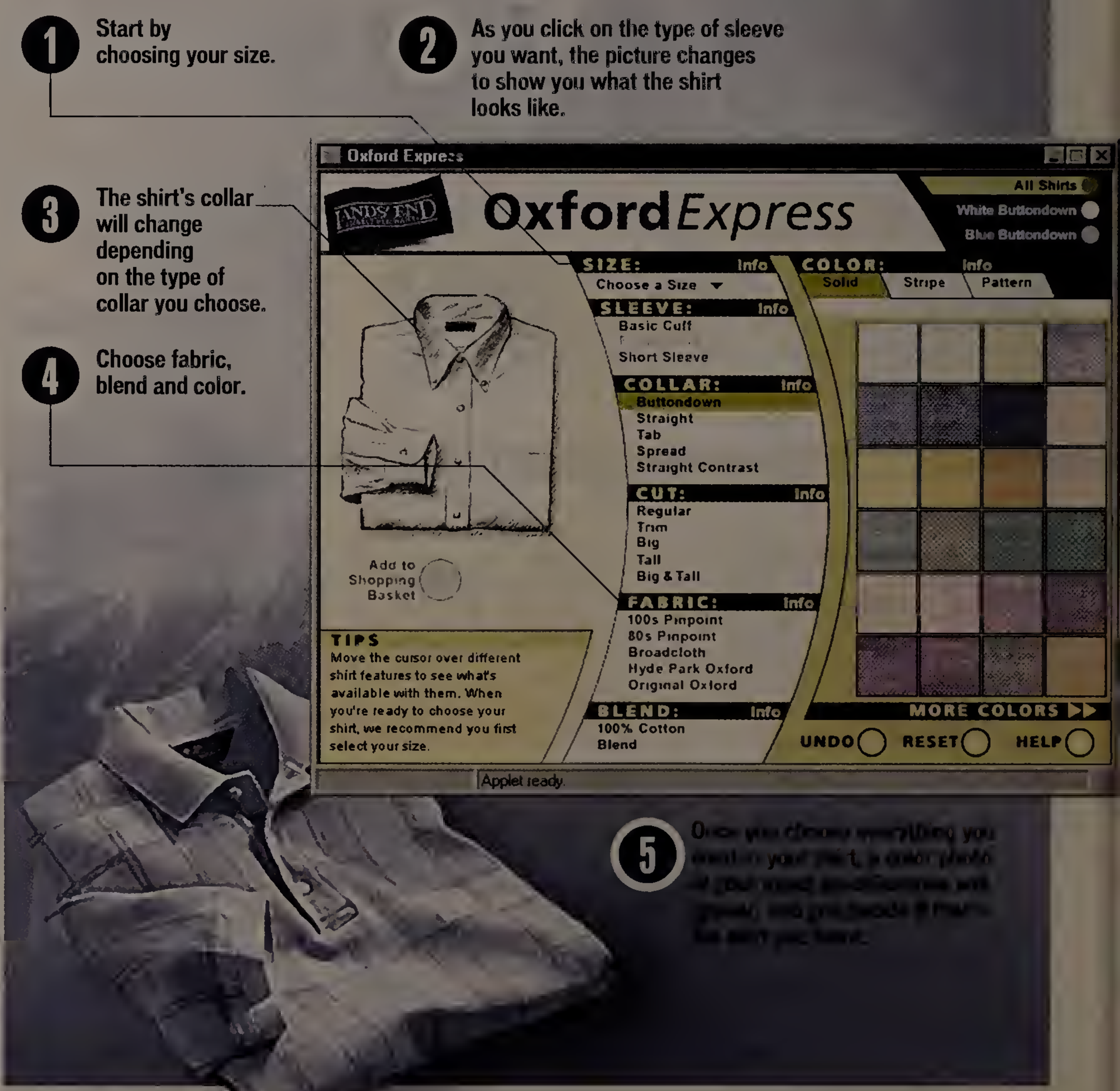
① Speed, direction and altitude at which the plane is traveling.

② The flight's origin and its destination. Red lines show where the plane has traveled; blue shows how much farther it has to go.

③ A map shows exactly where the plane is as the icon moves across the screen.

Here's an Example of a Java Applet That Helps You Shop

Go to www.landsend.com and click on Oxford Express. The Java applet lets you see exactly what the shirt you're ordering will look like. It's like going to the store without leaving your PC.



TIPS
Move the cursor over different shirt features to see what's available with them. When you're ready to choose your shirt, we recommend you first select your size.

Applet ready.

❶ Start by choosing your size.

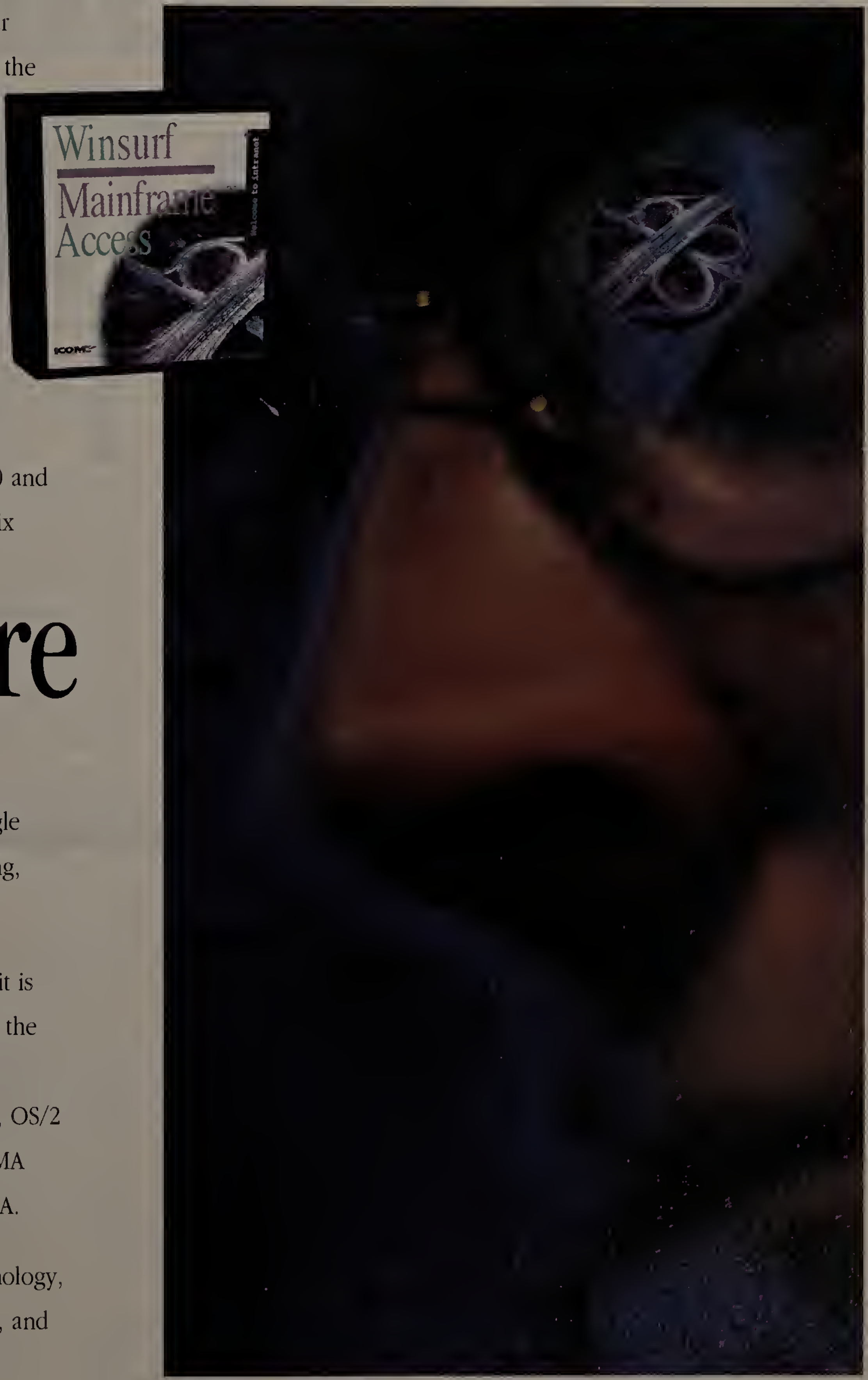
❷ As you click on the type of sleeve you want, the picture changes to show you what the shirt looks like.

❸ The shirt's collar will change depending on the type of collar you choose.

❹ Choose fabric, blend and color.

❺ Once you choose everything you want in your shirt, a color photo of your [illegible]

More than Web-to-Host



If you have a mainframe, somewhere around 70% of your corporate data is on it. But if that data is not available to the users who need it, it's being wasted.

When is web-to-host not enough? When you can't access all of your hosts from all of your client platforms; when it's too slow; when you need to sacrifice important features in order to have it.

When is web-to-host more than web-to-host? When it's Winsurf Mainframe Access. WMA gives users concurrent browser-based access to all of your data, combining 3270 and 5250 access to IBM hosts with VT access to DEC and Unix hosts. WMA lets you control deployment, access and configuration rights throughout your network from a single central server. And you don't need to sacrifice full printing, HLLAPI support, or file transfer capability.

It's Your Future

Web-to-Host technology is exploding; projections* show it is the future for host access. WMA's technology is ahead of the pack, with ease of use, native support for 16- and 32-bit Windows clients as well as HTML-based support for Mac, OS/2 and other clients. In addition to TN3270 and TN5250, WMA supports native access to SNA server and Netware for SAA.

Call Data Interface to learn about this exciting new technology, and about how WMA makes it cost-effective, easy to use, and easy to manage.

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** Source: International Data Corporation*

Visit us at Networld+Interop, May 10-14, Las Vegas, Booth #583.

VPNs Build Momentum

Cost savings are the powerful allure of IP-based private nets. But IT waits for a mature industry, performance and safeguards

By Elisabeth Horwitt

FOR BLACK & VEATCH, the principal benefit of using IBM Global Network's virtual private network (VPN) service for remote access can be simply stated: no more $200 overseas phone bills from foreign hotels.

"In some countries, hotels charge $5 to $6 per minute, so we could get a bill for $200 for a single night" when engineers dialed home to check e-mail or to access financial or product information, says Jim Baird, manager of networked systems at Black & Veatch Solutions Group, the information technology arm of the Kansas City, Mo.-based construction and engineering firm.

Engineers can now make a local call to an IBM Global Network point of presence pretty much anywhere they travel overseas. They can then log on and communicate with corporate systems over the carrier's IP backbone. The cost: 5 to 12 cents per minute. Better still, "We don't have to pay the cost of caring [for] and feeding a bunch of modems or remote access servers around the globe," Baird says. "We're paying a carrier to extend the boundaries of our IP network."

Black & Veatch is far from alone in perceiving the VPN's potential as a remote access vehicle. "Interest in VPNs is very high because of the potential cost savings," says Cherry-Rose Anderson, a research analyst at Gartner Group Inc. "Nearly 100% of the enterprises I talk to on a regular basis about remote access are looking at the role VPNs could play in their enterprise."

According to industry watchers, Black & Veatch, along with a handful of other bleeding-edge firms, is at least a couple of years ahead of the rest of corporate America when it comes to implementing VPNs.

Virtual Privacy

The basic VPN concept is to create a virtually private connection over a shared IP-based network medium: either the Internet or a service provider's IP backbone. That's accomplished by IP addressing — which sets up a point-to-point flow between, say, a remote PC

VPN in the Real World

1 A traveler's laptop makes a local call to the service provider's point of presence, submits ID (to either a service provider or the corporate VPN concentrator) and is authenticated and assigned an IP address

2 User starts sending packets encrypted and encapsulated with corporate IP address by client software

and a corporate VPN server — and by security mechanisms like user authentication and encryption (see diagram).

VPN cost savings over a traditional remote access server or modem banks and dial-up lines range from 30% to 70%, depending on the type of VPN equipment and service implementation used and where users are located, says Eric Zines, a senior consultant at Telechoice Inc., a Dallas research firm.

Big Savings

For example, when FormFactor Inc. switched from dial-up remote access to Intelispan Inc.'s VPN service, connect charges from Asia to the Livermore, Calif., data center plummeted from $150 per hour to $21 per hour, according to Gene Donlan, IT director at the computer chip testing probe manufacturer. From Europe to California, Intelispan charges $9 to $12 per hour of connect time, compared with typical European long-distance charges of $40 to $60 per hour. Anywhere in the U.S., it's $2 to $3 per hour for the VPN service.

VPNs can also mean big savings in the man-hour costs of administering remote access equipment, users say. "Say you want to support concurrent [remote] access for up to 200 users: That means 200 [outgoing] lines, 200 modems and 200 connects into your firewall — all of which need to be managed," Donlan says. "That's pretty labor-intensive" compared with a single VPN concentrator.

Even with carrots like those to tempt them, however, corporate IT departments are hardly racing toward VPNs. "Almost no one I've talked to has deployed a VPN network on any significant basis," Anderson says. "Penetration right now is very low, although we expect significant growth over the next couple of years."

What's holding users back? Many are waiting for the technology to mature and the industry to stabilize, analysts say. A lot of key products are only starting to ship. For instance, the Communications Network conference in January saw a slew of vendors, including Altiga Networks in Franklin, Mass., Network Alchemy Inc. in Santa Cruz, Calif., and VPNet Technologies Inc. in San Jose, announce high-end VPN concentrators that can handle thousands of remote users concurrently.

More important, perhaps, users want to be sure VPN products can address what many see as the Internet's main drawbacks as a business communications vehicle: its lack of security safeguards and the impossibility of guaranteeing end-to-end network performance for high-priority or latency-sensitive applications.

When Telechoice recently surveyed more than 500 telecommunications and IT managers, security and performance were the two areas most cited as "very important" by those respondents who said they were buyers planning to implement a VPN within the year.

VPN technology addresses the Internet security issue through tunneling, in which two systems establish a secured point-to-point connection, or tunnel, across the Internet or a shared IP backbone through one or more security mechanisms. To set up a tunnel, the remote client first would have to know the receiving corporate system's IP address, then identify and authenticate itself before making use of encryption software that the receiving system also uses. Some companies use public-key infrastructure for added security.

Unfortunately, all of those security mechanisms add significant overhead, to both packets and the communications equipment that processes them, which can seriously degrade throughput.

While evaluating VPN equipment a year ago, for example, FormFactor, in Livermore, Calif., concluded that tunneling could mean an overall throughput reduction of 40% to 70%, Donlan says. That was a problem because traveling sales and design engineers would be using those remote VPN connections to do critical tasks: process sales orders, answer customer service requests and coordinate new card designs. "We wanted those connections fast and secure, as if they were locally attached," Donlan says.

A third reason users are taking a wait-and-see tack with VPN: Its nature keeps changing. First it was straight tunneling over the Internet. Then Internet service providers and carriers like IBM Global Network and AT&T Corp. started offering VPN connections over their commercial IP backbones.

With such one-carrier VPN services, "throughput is a bit more predictable [than it is on the Internet], and security is better too, because [connections] aren't as public or accessible to the world," Baird says. To some users and analysts, however, those aren't true VPN services. That's because the customer must still install in-house equipment to take care of encryption and authentication.

But that's changing. The major providers are starting to provide authentication and encryption on their systems. And the latest generation of VPN offerings go further, offering to take more of the burden of administering remote user connections off customer premises — and off the shoulders of in-house telecommunications managers.

"A number of equipment and service vendors are working on VPN solutions that live entirely in the [wide-area network service] cloud," Zines says.

Two examples of value-added or managed VPN services are Intelipath, in Scottsdale, Ariz., and Concentric Network Corp. in San Jose. Denver-based Qwest Communications Corp. plans in the third quarter to introduce what it calls a "network-based VPN service" that will provide authentication, encryption and firewall services within the network, "so there's no extra gear [such as a VPN concentrator] to be administered on premise," says Bill McLeod, Qwest's director of Internet services marketing.

> **"We're paying a carrier to extend the boundaries of our IP network."**
>
> JIM BAIRD,
> MANAGER OF NETWORKED SYSTEMS,
> BLACK & VEATCH SOLUTIONS GROUP

Full-Service Package

The comprehensiveness of Intelispan's VPN services was the main reason FormFactor chose it over rivals such as AT&T and IBM Global Network, Donlan says. Intelispan handles encryption and identification/authentication for customers and also provides an optional public-key identification security layer on its own systems. FormFactor's IT managers do the initial setup as well as updates of user access rights and new users, Donlan says, but the equipment is maintained by Intelispan.

"We're a relatively small company, and we didn't want to waste human resources managing our own wide-area network," he adds.

Other organizations share those sentiments. Fitchburg State College has been pilot-testing Lexington, Mass.-based Digital Signal Communications Inc.'s VPN services as a means of giving commuter students and telecommuting faculty access to on-campus computing resources.

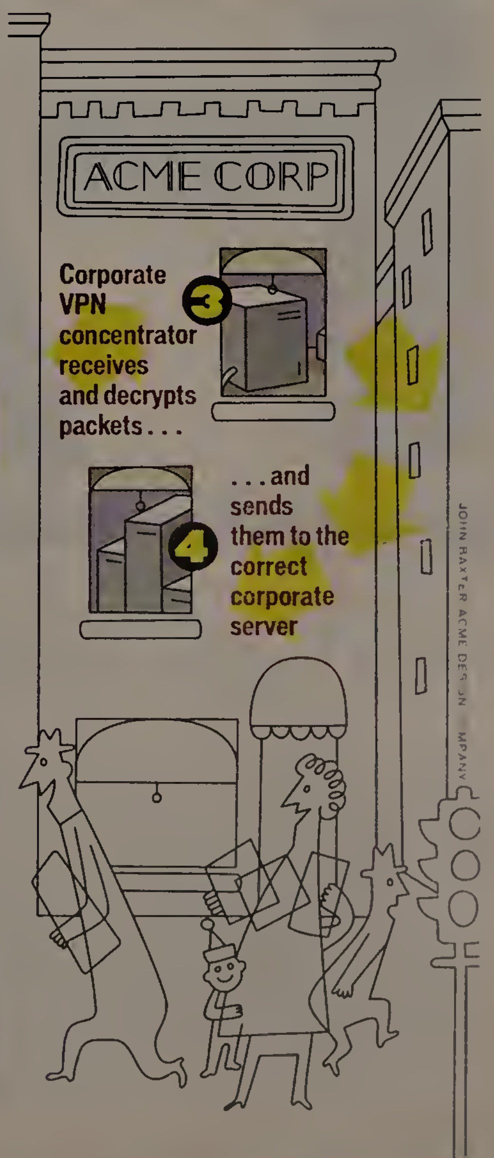
"They said they could provide points of presence all over New England, which would mean a local call for everyone, instead of building up a remote modem pool and charging people for long distance or a [toll-free] number," says Joe Turner, associate director of MIS at the Massachusetts college.

Even better, from Turner's point of view, the service provider has offered to take over several administrative tasks. "We knew it would be harder to find [technical] personnel than to pay for the equipment," Turner says. Digital Signal Communications' VPN service includes help desk support, user billback services and the management of user authentication on its Radius server. Fitchburg State will still need to install a VPN concentrator to handle encryption and tunneling, but the service provider supplied technicians to help implement and configure the Altiga VPN concentrator it sells to customers.

Even so, Fitchburg State — like many potential VPN implementors — is still far from an enterprisewide rollout, Turner says. "I'm going to outline the technology and capabilities of VPN to key academic and administration people, and let them decide."

Fitchburg State's chief financial officer and key members of Turner's staff have been trying out VPNs as a way to access computing resources on a Windows NT server on campus. They previously used Symantec Corp.'s pcAnywhere dial-up software. "PcAnywhere was a lot slower," Turner says. "But we'll see if they care whether we pull the plug on the VPN service after the pilot test is over. The last thing I want to do is force VPN down users' throats." ◗

Horwitt is a freelance writer in Waban, Mass. Her Internet address is ehorwitt@compuserve.com.


ACME CORP
Corporate VPN concentrator receives and decrypts packets . . .
3
. . . and sends them to the correct corporate server
4

JOHN BAXTER ACME DESIGN COMPANY

FLAT OR FAT?

DESKTOP DISPLAYS: IT managers need to be aware of the technical and support issues involved in deploying flat-panel monitors, not just their added cost By Russell Kay

FLAT PANELS

IN MANY OFFICES, flat-panel display monitors have become the newest high-tech status symbol. But realistically, why should you even consider equipping your organization's users with desktop flat panels? That's a question that information technology managers are going to have to confront over the next few years — because flat-panel monitors are coming on strong.

If you've ever worked with a good desktop flat-panel monitor, you know the primary reason users want one: Everything looks better on it. And the monitors take up so little physical space — especially compared with large CRT monitors — that they return a significant chunk of desktop real estate. For most people, to use one is to want one. The obvious problem is justifying their cost, but there are other issues an IT manager needs to take into account.

For one thing, screen size may be far more important to the user than the monitor's footprint on the desktop. Many — perhaps even most — users are likely to prefer a $600, 19-in. CRT to a $1,000, 15-in. flat panel. The CRT is somewhat more versatile: It can be used at higher screen resolutions that allow more windows to be open on-screen simultaneously — and let more data be displayed. And as far as CRT size being a problem, if the monitor is placed in a corner, as is common in offices today, the physical size of the unit is less important; the space that would be gained by using a flat panel may not be of real use.

But anyone who uses multiple monitors (a feature

Flat Panels Hit Wall Street

BY KEVIN BURDEN

Hey – why do *they* get flat-panel monitors? And not just one, but sometimes two or three on each desk. How do Wall Street traders justify those expensive, ultrasleek displays as being as standard as their wing tips while the majority of us stare into space-hogging, hulking tubes?

Well, Wall Street does have legitimate reasons, and they go far beyond the desire to have impressive-looking trading floors or the ability to afford the displays.

Flat panels offer traders a way to display more information on their desks. Traders are notorious for surrounding themselves with multiple screens to simultaneously monitor different exchanges, stock tickers and news programs. With flat panels they can use even more, which is why financial firms have been among the first to adopt the technology. The 3-in.-thick monitors also let those firms squeeze more traders into limited spaces.

One company that has redesigned its trading floor, using flat panels to save space, is NatWest Global Financial Markets, a foreign currency exchange firm in Manhattan. NatWest purchased roughly 300 flat-panel displays from Eizo Nanao Technologies Inc. and Compaq Computer Corp. last December, which enabled it to reconfigure the room with new desks that are a full eight inches smaller than the old ones, according to Frank Aurichio, assistant vice president of trading floor technologies at NatWest.

"That allowed an additional, single row of desks in some places," he says.

But NatWest isn't putting its redesigned environment ahead of traders' needs. Despite their smaller desks, traders have more working and storage space. "That's how much room 17-in. screens were taking up," Aurichio says.

And with the smaller footprint of flat panels, traders are able to fit more of them on their desks. Where two monitors once fit, four flat panels can now sit, says Michael Nelkens, vice president of market data technologies at NatWest. "We've even hooked up as many as four screens on to one computer," he says.

The ability to connect to multiple sources is unique to certain flat-panel displays, which can further enhance the amount of information traders can display. "It's now fairly common to see our traders typing into a spreadsheet on one screen, [with] exchanges from around the world displayed on others and . . . the [Kosovo] war on CNN on still another [display]," Nelkens says. ◗

NATWEST'S MICHAEL NELKENS says traders can use flat panels to stay abreast of several information sources simultaneously

BRIAN SMALE

enabled by Windows 98 and NT 4.0) can instantly appreciate the reduced footprint of flat-panel displays. It's hardly surprising that financial trading firms, which might have three or four monitors on each person's desk, were among the first to adopt flat panels (see story, above).

My Friend Flicker

You must also take into account the support, maintenance, flexibility and applicability issues when deciding whether to move to flat-panel displays. And even when you've decided you can justify or afford one, you need to determine if it's the right choice for your users' applications.

For most office and productivity applications, that's no problem. Flat panels present a stable image with no flicker whatsoever, and the clear definition of their pixels — with no image blooming or focus problems — makes on-screen type and graphics appear sharper than do similarly sized CRTs.

There's a significant trade-off for that sharpness, however. Unlike CRTs, the LCDs used in flat panels are designed with a single image resolution in mind. For 14- and 15-in. desktop flat panels, that's usually a resolution of 1,024 by 768 pixels, which may be too small for easy use by some people.

A few years ago, before the advent of desktop flat panels and big-screen laptops, the commonly accepted wisdom held that you didn't run Extended Graphics Array (XGA) on anything smaller than a 17-in. monitor. Now we're looking at 14-in. LCDs running XGA, and for some users that presents icons and menus that are just too small. (There are workarounds, but they clearly involve extra support time.)

So if XGA is too fine, why not run at a lower resolution of, say, 800 by 600 pixels? That's what you would do with a CRT monitor, but it may not be a workable option for an LCD panel. At present, there are only two ways to display a lower resolution on an LCD screen: One is to reduce the physical size of the displayed image (by putting a black frame around it), which defeats the purpose of going to a lower resolution in the first place because it doesn't change the displayed size of anything. The second, more common approach is for the display to interpolate pixels as best it can. But once you deviate from an LCD panel's built-in resolution, you give up the one-to-one correspondence between horizontal pixels (in the output image) and horizontal triplets of thin film transistor elements (in the physical display panel).

It's that one-to-one relationship that makes the image so sharp and clear in the first place. Some flat-panel displays handle that translation with relative grace and minimal image degradation. But some cannot, instead showing visible irregularities and bad-looking letters and numbers — just the things we work with most.

Big Adjustments

Finally, while the flat-panel display industry is in the process of moving to digital interfaces with graphics cards, most of the panels available today are using analog output. That makes setting them up a very different experience than with CRTs; you'll need to make adjustments you've never heard of before. It's helpful that you no longer have to adjust image sizing and placement or correct geometric distortions, but those corrections were relatively intuitive and easy to make.

Instead, you now have to adjust some obscure — and often hair-trigger — parameters such as clock phasing and frequency. Making those adjustments isn't that difficult, but the real problem is that most users and technicians don't clearly understand the basic functions of the new controls or their interactions. Thus, if you roll out a number of flat-panel monitors, you can expect to have IT staff spend time setting up the display for each computer separately. You may also need specialized software tools like Sonera Technologies' DisplayMate for Windows.

Maybe Too Light?

The remaining advantage of the LCD display is its light weight: It has one quarter to one-third the bulk of a similarly sized CRT monitor. Flat panels are easy to move around; with many, you can detach the panel from its weighted base and hang it on a cubicle wall or extension arm. Unfortunately, that portability and detachability also make flat-panel displays obvious — and attractive — targets for theft. Newer flat panels come equipped with built-in slots for locking devices, from vendors such as Kensington Technology Group, that are much like those already being used to protect laptop computers from walking away.

Thin Will Be In

Any IT manager planning for future technologies should right now be considering how to deal with the many issues raised by flat-panel displays. It's clear that they are gaining in popularity, falling in price and creating demand among users. According to Ross Young, president of DisplaySearch in Austin, Texas, flat-panel monitor sales are expected to grow by over 600% per year in the near future. In the end, it might not be a matter of whether you roll out flat-panel displays — but when. ◗

Flat, Thin, Big, Beautiful – Pricey

BY CHRIS LINDQUIST

THOSE back-breaking, power-wasting monitors on your employees' desks are nearly obsolete — the flat panels are here. The new displays can save in a lot of ways: in size, weight, power — even eyesight.

About the only thing they won't save your company, at least in the short term, is money.

FLAT PANELS

Flat-panel LCDs may not be new, but they've tended to cost far more — and perform worse — than their CRT predecessors. As a result, LCDs initially found homes on notebook computers, in which portability was critical and buyers weren't so price-sensitive.

But in the past year, that situation has changed. Flat-panel technology has improved, providing better image quality. Colors jump off the screen and text is sharp even in the smallest font sizes. And price cuts from suppliers have made sub-$1,000 desktop LCDs possible.

Several of the new monitors are bypassing traditional analog display technology, as well. To work with the graphics cards found on the majority of PCs, most desktop LCDs must contain an analog-to-digital converter.

But today's all-digital panels are eliminating that conversion process — keeping PC images digital all the way from the CPU to the screen. That eliminates performance bottlenecks and provides significantly better picture quality.

But while the Asia financial crisis initially prompted LCD makers to cut prices in order to bring in much-needed cash, it also caused many of them to stop construction of LCD manufacturing facilities. As a result, the latest crop of digital flat-panel displays is actually more expensive than the last.

Falling Prices

Flat-panel prices might soon be dropping, however, thanks to a new technology called Field Emission Display (FED). Like CRTs, FED panels use illuminated phosphors to produce images, but they don't require the bulky electron gun found in CRTs.

FED desktop monitors slated to arrive next year should cost around $500 — making them competitive in price with similarly sized CRTs, according to Rob Enderle, vice president in charge of desktop and mobile technology at Giga Information Group Inc. in Cambridge, Mass.

FED monitors do have one disadvantage: "The current generation of flat-panel displays arguably don't wear out," Enderle says, whereas "FED technology tends to run out of steam in three years."

That means buyers should expect to replace their FED monitors after about 36 months.

But for now, digital active-matrix LCDs are all the rage, so we took a look at three: One each from ViewSonic Corp., Mag InnoVision Co. and Number Nine Visual Technology/Silicon Graphics Inc. They all cost more than CRTs of a similar size, but each has its unique advantages. ◗

Lindquist is a freelance reviewer in Moss Beach, Calif. Contact him at chris@lindquist.com.

ViewPanel VPD180

ViewSonic Corp.
www.viewsonic.com
$3,995

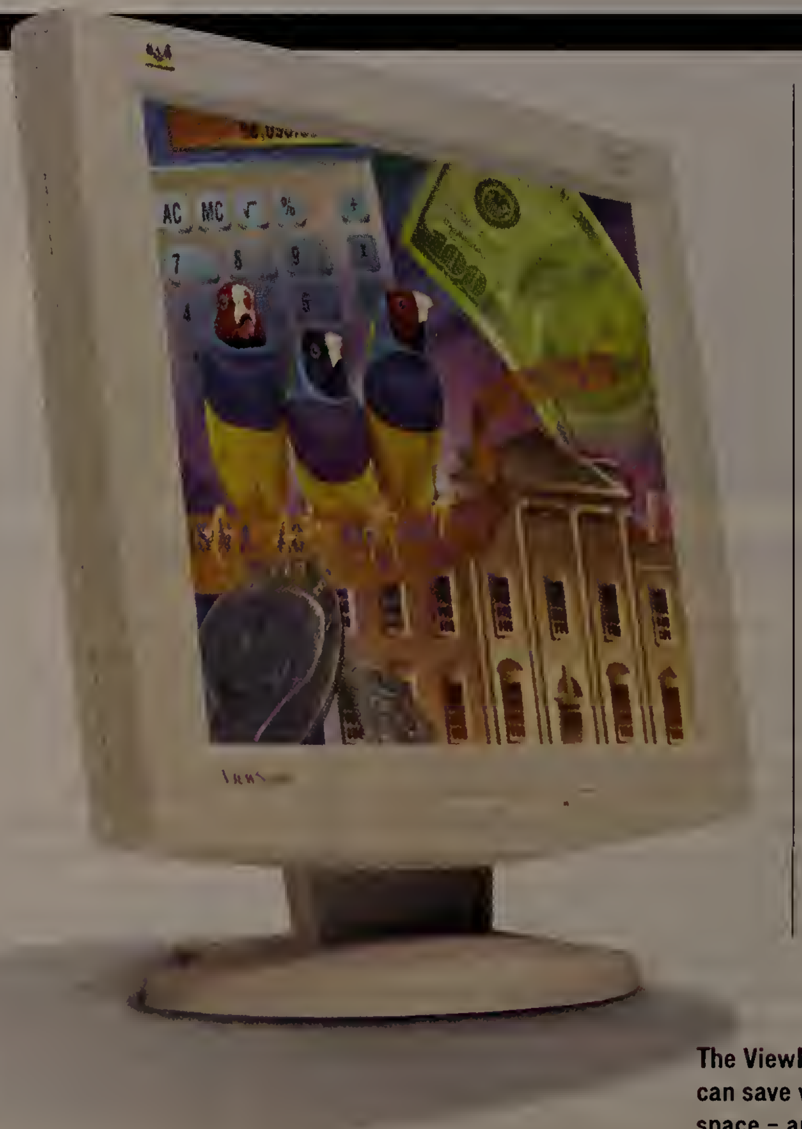
Big – that's the first impression most people will have of the VPD180. The 18.1-in. (measured diagonally) digital display shows off images as large as many 19-in. CRT monitors but, at 18-by-9.5-by-17.25 inches, takes up a fraction of the desk space. And at just over 13 pounds, it's still light enough to carry under one arm.

Viewers will be impressed by the display's image quality, too. At its ideal 1,280-by-1,024-pixel resolution, 6-point fonts were legible and 8-point fonts were usable. The monitor was quite bright, and colors were rich and well-saturated – though not as much as the 1600SW reviewed below.

Like most flat-panel displays, the VPD180 can be removed from its tilt-swivel desktop stand to be attached to a wall or mounted on a swing arm or other vendor-specific holder.

The VPD180's biggest drawback is its price. At nearly $4,000 – without a graphics card – you won't be putting that display on many corporate desktops.

But for special-purpose tasks that require extensive screen space without eye-fatiguing flicker or a big footprint, the VPD180 might be a good alternative to 19- and 21-in. CRTs.



The ViewPanel VPD180 can save valuable desk space – and your eyesight

LT530C

Mag InnoVision Co.
www.maginnovision.com
$1,299

Though neither as large nor as flashy as the other two displays we examined, the 15-in. LT530C does have its advantages.

First, it's a pivoting display. Install the included driver software and you can rotate the screen 90 degrees for both landscape- and portrait-mode viewing. Portrait mode is ideal for looking at a full page of text and graphics – there's no need to scroll to see the entire document.

Second, the LT530C is relatively inexpensive. It lists for just under $1,300 (including an ATI Technologies Inc. Xpert LCD digital graphics card), but you can find it selling for less than $1,000 at many retailers, making it cost-comparable to high-end, 19-in. CRTs.

On the downside, the LT530C didn't display images with the same quality as the VPD180 or 1600SW (reviewed below), but was more than adequate. Six-point text was a near-illegible gray, but 8-point fonts were very black and readable. Colors were also a bit washed out compared with our other test displays, but not enough to be annoying.

The LT530C is a good choice if you're looking for a pivoting LCD display that doesn't cost a bundle.

Digital Flat Panel Solution Pack

Number Nine Visual Technology/Silicon Graphics Inc.
www.nine.com
$2,795

If you want to make other execs jealous, the Digital Flat Panel Solution Pack from Number Nine and Silicon Graphics Inc. (SGI) should do the trick.

The pack includes an SGI 1600SW flat-panel display and a Number Nine Revolution IV-FP graphics card. Both boast exceptional features that add up to an outstanding display for professional users.

The 1600SW sports a futuristic look, with a gray-and-blue bezel and stand. But there's an even more striking physical feature: The display has a widescreen format of 1,600 by 1,024 pixels. With a 17.3-in. diagonal measurement, it can display two full pages of text side by side. Although it's not as clear with 8-point text as the VPD180, the 1600SW produces sharp, black text that's extremely easy on the eyes.

The display really brings images to life. Of course, part of that quality comes from the graphics card. The Revolution IV-FP comes with 32M bytes of RAM and a complete set of flat-panel control features, including color temperature (the relative levels of blue and red displayed), which wasn't offered on the ATI cards we used to test the other monitors.

At $2,795 for the card and display, the Solution Pack setup looks like a bargain.

*Estimated reseller price to end users for models 6287-32U and 654102N. Actual prices may vary. Certain features described below are available for an additional charge. SystemXtra is available to credit qualified commercial, state and local government customers with valid credit for a 36-month term. †SuccessLease is offered and administered in the U.S. and Canada by Fidelity Leasing Inc., an approved provider of financing for IBM Global Financing. Monthly lease costs are provided by Fidelity Leasing and are for a 24-month term, full-payout lease, to qualified business customers only. A documentation fee and first month payment due at lease signing. Any taxes are additional. Other terms and financing structures are available. mhz denotes microprocessor internal clock speed; other factors may also affect application performance. gb=1 billion bytes for Hard Disk Drive capacity. PCs referenced in this ad include an operating system. IBM product names are trademarks of International Business Machines Corporation. Intel and the Intel Inside logo are registered trademarks and Celeron is a trademark of Intel Corporation. ©1999 IBM Corp. All rights reserved

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Technology Happenings

- **The Department of Defense** Research Projects Agency contracts the University of Illinois to build a parallel-processing computer, the **ILLIAC IV.**
- U.S. manufacturers introduce **hand-held electronic calculators** to the retail market. Texas Instruments Inc. unveils the first solid-state version, which has no electronic display. It prints answers on heat-sensitive paper.
- **Dr. Michael DeBakey** becomes the first surgeon to successfully use an artificial heart pump. It is used as a left ventricular assist device.
- The Federal Communications Commission launches its **first computer inquiry**.

In Space

- **January:** An unmanned Soviet spaceship lands on the moon and begins sending signals back to Earth.
- **March:** The Soviet Union lands 1-ton spacecraft on Venus. The first orbital docking is performed during the flight of Gemini VIII.
- **June:** The U.S. space probe Surveyor I lands on the moon and begins transmitting detailed photographs.
- **November:** The flight of Gemini XII ends successfully as astronauts James A. Lovell and Edwin "Buzz" Aldrin Jr. splash down in the Atlantic Ocean.

Born in 1966

- **Albert Belle,** Baltimore Orioles
- **Robert Morris Jr.,** U.S. computer scientist, who released the Great Internet Worm in 1988

Other Notables

- **Peter Drucker** releases a book on leadership in organizations, *The Effective Executive.*
- **Best Picture:** *A Man for all Seasons*
- China's **Cultural Revolution** begins.
- **The first *Star Trek* episode,** "The Man Trap," is broadcast.

HP's Radical Move

BY LESLIE GOFF

1966

NEITHER BOB Grimm nor Roy Clay nor any of the other folks on the team that engineered Hewlett-Packard Co.'s first foray into the computer market in 1966 would have believed it if someone had said that HP's instruments business would one day be computing's weaker sibling.

"I don't think anyone at that time dreamed that the computer business would take over. Not even Bill Hewlett or Dave Packard," says Bob Grimm, who in 1966 was general manager of HP's Dymec division. "They were very farsighted. But the idea that we would split the company some day and the HP name would go with the computer business would have been laughed at."

Debuted in November 1966, the 2116A was designed to automate the collection and processing of data from the company's test and measurement devices. Without realizing it, architect Kay Magleby and the team that developed the 2116A ultimately altered HP's future when they decided to build a general-purpose computer that could be tied to myriad instruments via plug-in cards rather than creating a very device-specific machine.

The target customers for the 2116A were HP's bread-and-butter engineers — the folks who had to measure, test and calibrate. They could hook HP's nuclear scalars, electronic thermometers, digital voltmeters, pressure transducers — anything that collected data — to the computer using the cards, which featured only a cable, the connectors and the hardware interface. The data collected could then be manipulated and compared with data collected earlier, via the software; the results were printed to magnetic or punched tape or to a Teletype machine.

The plug-and-play ease with which customers could connect their existing instruments to the 2116A was a key marketing point — and also the feature that changed HP's destiny.

"The idea of having a small computer owned by a department was a radical concept," Clay explains. "And in a lot of companies, if you wanted to buy a computer, you had to go through a hierarchy. You couldn't just sell it to the person with the problem like the instrumentation products."

And it was a hard sell internally, too. HP sales managers "were not at all excited about it. They didn't want to use any of their best field engineers on this new gadget," Grimm says. He managed to recruit four people, whom he put through six months of training on the 2116A. They backed up the sales representatives and drove the 30-in.-high, 230-lb. computers around in station wagons to customer sites for demonstrations.

The 2116A project was "radically different" from other areas of HP. Its staff saw the potential applications of the 2116A as more than just a back-end for instrumentation, says Clay, who led software development and is now president of ROD-L Electronics Inc. in Menlo Park, Calif.

Even though HP had no intention of selling the machine as a general-purpose computer, it was purchased by several companies, including Tymshare, as the basis for time-sharing systems. So when Holiday Inn came to HP seeking a fail-safe computer for a point-of-sale system, Clay's team tied two boxes together in a parallel-processing model. If one failed, the other would take over. Holiday Inn was sold on the idea, but HP's senior managers were not; the system had nothing to do with the original purpose of the 2116A. "Bill Hewlett called me," Clay recalls, "and he said, 'Cancel the order and terminate the project.' And at 3 p.m., it was terminated."

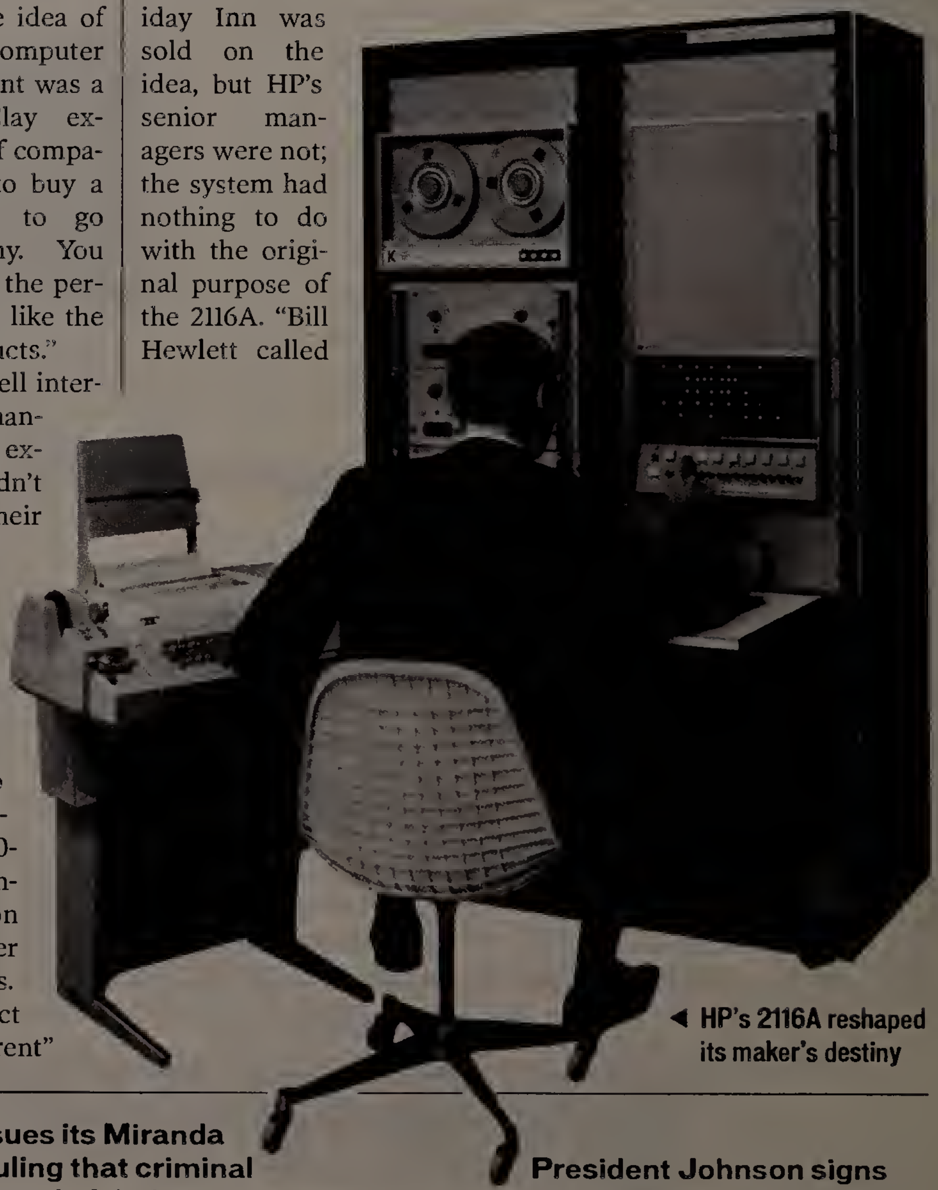
HP wouldn't commit to the computer industry on a significant scale until 1975, when it introduced its HP-3000 series. More than 20 years later, in 1999, HP would reorganize to formally acknowledge the computer business as its core product line.

"The recent split is at least 180 degrees different from 1966," Clay says. ◗

Goff is a frequent contributor to Computerworld. *Contact her at lgoff@ix.netcom.com.*

MOREONLINE

For more on HP's 2116A, visit our Web site.
www.computerworld.com/more



◀ **HP's 2116A reshaped its maker's destiny**

Robert C. Weaver becomes the first black Cabinet member. President Lyndon B. Johnson appoints him Secretary of Housing and Urban Development.

The Supreme Court issues its Miranda vs. Arizona decision, ruling that criminal suspects must be informed of their constitutional rights prior to questioning by police.

President Johnson signs a bill creating the Department of Transportation.

JANUARY FEBRUARY MARCH APRIL MAY JUNE JULY AUGUST SEPTEMBER OCTOBER NOVEMBER DECEMBER

U.S. bombers carry out their first strikes against North Vietnam. Two months later, the U.S. bombs fuel-storage facilities near the North Vietnamese cities of Hanoi and Haiphong.

The National Organization for Women is founded.

The U.S. says it will halt bombing of North Vietnam when Hanoi assures that it will discuss peace terms seriously.

■ Flashback is produced with the assistance of The Computer Museum History Center in Mountain View, Calif.

"It's easy to sit down and crank out thousands of words of well-behaved analysis, but IT and business leaders just don't have time to sift through all the rhetoric. What they really want is strong, punch-through opinions, sharp analysis. As a columnist, I'm going to be there pounding the table and waving my hands. I'm going to get in your face. I'm going to say it loud and clear, but I'm not going to be unfair. I'm always rooting for the business people who actually buy and use information technology. I want to know what's getting in their way, where's the pain. I want them to get home for dinner more often. I want them to win."

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All Work Nets No Play

Evolving network technologies keep network professionals busy and put the squeeze on hiring managers

By Deborah Radcliff

TEDIOUS WORK, long hours and average pay. That pretty much sums up the job of a networking professional.

No wonder information technology shops can't find enough of them.

Networking, in fact, ranks as the most in-demand skill two years running, according to a March "Hot Jobs" report by the IT staffing and project consulting firm, RHI Consulting Inc. in Menlo Park, Calif.

Most in demand are highly skilled network engineers and designers, for which companies are willing to pay $60,000 to $100,000, plus bonuses and stock packages, depending on experience and size of the employer's network. Sound like great pay? Not when you consider the hours you have to work, Joseph W. Rowell says.

Computerworld interviewed Rowell and two other hiring managers to get the skinny on what they and their counterparts are looking for in networking professionals.

Q: What types of networking jobs are in highest demand?

PATTERSON: We need people who can design the network, configure and install routers, monitor the network and troubleshoot it.

ROWELL: What we really need are network designers and engineers. There isn't much demand for network managers. They just sit there and watch the network, which can be done with the help of network management programs. We outsource a lot of that.

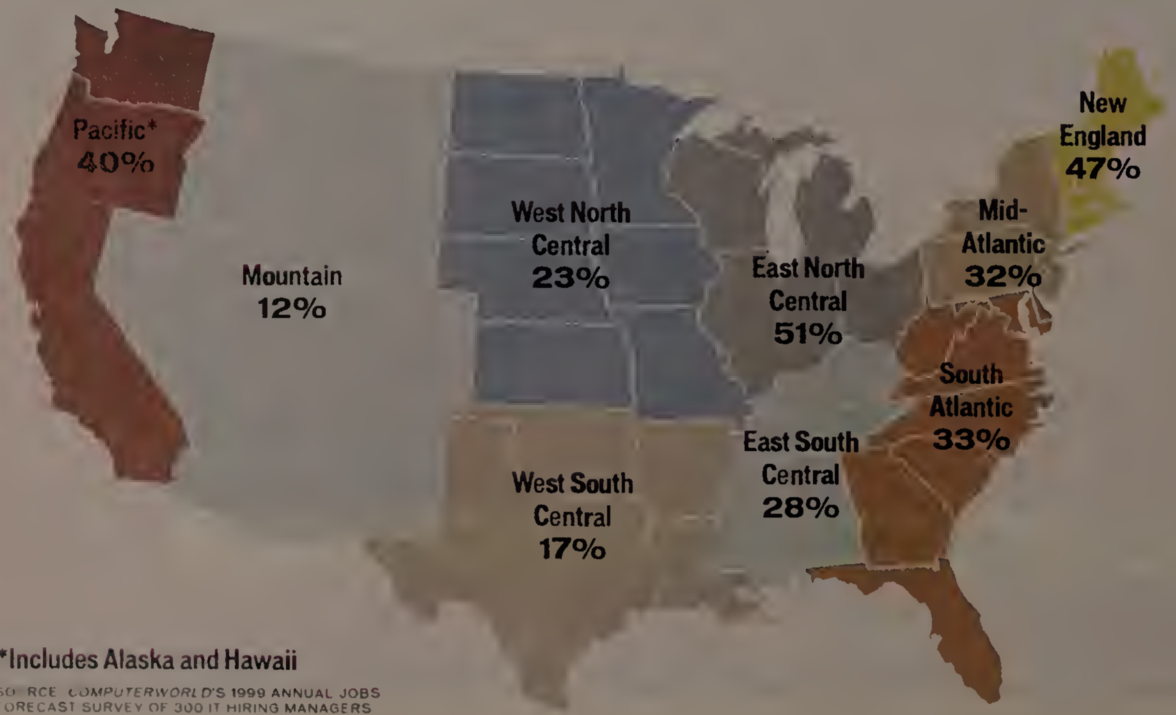
Q: Why is there such demand for networking professionals?

ROWELL: You want it summed up? The big "I" — the Internet is driving the need for network designers. There's a push for all systems to be what I would call "technology aware" for sharing information from one network to the other.

PATTERSON: If other companies are like ours, they're probably in the process of changing their network from old to new technology and are in need of completely different skill sets.

Out for Networkers

Percent of hiring managers who plan to increase their IT staff with network administrators or analysts this year:



*Includes Alaska and Hawaii

SOURCE: *COMPUTERWORLD*'S 1999 ANNUAL JOBS FORECAST SURVEY OF 300 IT HIRING MANAGERS

The Panelists

Conrad Cross, director of technology at Applied Digital Communications in Orlando. He saw the burgeoning market for networking services, so he helped start a networking services firm.

Pat Patterson, vice president of information systems at Mazzio's Corp. in Tulsa, Okla. He oversees a call center pizza ordering/delivery network for a 100-restaurant chain. He has moved the network from leased-line services to Integrated Services Digital Network, frame-relay and virtual private network technology.

Joseph W. Rowell, technical services manager at Inchcape Shipping Services in Mobile, Ala. He redesigned his firm's network from SNA to a frame-relay, TCP/IP network to support new accounting, collections, customer service and logistics programs.

Q: What skills are most needed?

CROSS: Those who know IP are the ones building the networks right now. It is also very important that networking professionals have a significant amount of security experience. The most critical would be firewall implementation and administration.

ROWELL: People in this profession must have strong background in TCP/IP, OSPF [Open Shortest Path First] routing methods and SNMP [Simple Network Management Protocol]. And a key factor in network design is to be able to determine when you need a shared network as opposed to a switched network. Another thing: People need to understand how to use network analyzers to troubleshoot.

Q: How much are you willing to pay for those skills?

CROSS: When we can find someone who is a professional and knows the job and can do it in less than half the time [it takes] a junior-level person, we recognize we have to pay a premium. Depending on the size of the networking project, a strong network designer or engineer could command $150,000 as a contractor, which means no added benefits.

PATTERSON: Someone who's willing to jump in and dig out problems and learn new concepts and technologies needs to be rewarded. We can't pay as much as the larger companies in Tulsa, and we don't need someone with all the certifications worthy of six-figure salaries. But we are paying our network engineer in training $60,000 a year.

Q: How much emphasis do you put on certification and formal education?

CROSS: If I've got someone with three years in building IP networks [but who is uncertified], that person would get the nod over someone who was certified a year ago. It would be good if an effort is made toward certification. But what I look for is training and number of years in a particular discipline.

ROWELL: Marketability is really based on job experience. While most employers would like to see at least a two-year degree, they're really looking for network engineers who've designed complex, enterprise, worldwide networks. The engineer with this experience will blow away someone with 10 years' experience on a small network.

Q: How willing are you to sponsor certification and further train your networking professionals?

PATTERSON: If we can fill positions from within and train someone, we take that approach because that person is a known quantity.

Q: Is networking really the gruesome, sleepless work it's been portrayed as?

ROWELL: It's no joke. It's very time-consuming, tedious and, at times, stressful. And it's not a nine-to-five job. Networking is not a profession to get into if you do not love what you're doing.

Q: Once networking professionals reach the levels of engineering and design, where do they move from there?

CROSS: Most designers and engineers don't want to move up the corporate ladder ... Networking is a technology they get their high from. But if they do go into management for the perks, their next step would be director of technology or something like that. ◗

Radcliff is a freelance writer in Santa Rosa, Calif. Contact her at derad@aol.com.

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Sr. Software Consultant - Shrewsbury, MA to research new and emerging technologies in DCE and formulate and implement enterprise level solutions. Design and develop enterprise level software systems under OS/400 and MS windows. Extensive use of ILE RPG, DB2/400, VB 5.0, Access 7.0, Windows API, ODBC. M-F. 8:30 am - 5:00 pm. 40 hrs./wk. $80,000/annum. Require M S.* in Computer Science or equivalent. Background must include design, coding, testing and implementation of enterprise level software (such as Sales Tracking, Accounting, Marketing Forecasting systems) using ILE RPG, DB2/400, VB 5.0, Access 7.0 and Windows API. *May substitute MS with BS + 5 year's of related progressively responsible Post Bachelor's experience. Send 2 resumes to Case# 81310, PO Box 8968, Boston MA-02114

Full-time Project Manager, Client/Server Development. Responsibilities include: manage client/server applications development, manage systems analysts and support staff; plan, monitor and prepare status reports; audit applications quality to ensure adherence to Quality Management Systems; manage implementation of applications; manage user acceptance tests and user training; serve as chief liaison between client and Director of Client/Server Applications Development; manage installation and tuning of SQL Server. Must have a Master of Science degree or foreign equivalent in Computer Engineering or a related field and three (3) years of progressive experience in analysis of client/server systems development or a Bachelor of Science degree or foreign equivalent and at least five (5) years of progressive experience in analysis of client/server systems development; must be fluent in Visual C++ and in the development of client/server applications using SQL Server. Must be willing to travel to client sites Monday-Friday. Must have proof of legal authority to work in the United States. Salary Range: $64,002-$80,000 per year. If interested, submit resume in duplicate or apply in person: Ms. L. Anne Keller, Senior Associate - Human Resources, NIIT (USA), Inc., 1050 Crown Pointe Parkway, Suite 900, Atlanta, Georgia 30338

Full-time Computer Services Manager. Responsibilities include: manage the development and marketing of software services; manage strategic planning and budget allocation; develop and negotiate proposals for the provision of software services; negotiate project costs; manage marketing analysts, systems analysts and other technical support personnel; and manage client relations; must have a Master's degree or foreign equivalent in Business Administration, Computer Science or a related field and three years of experience as a computer systems or marketing analyst or a Bachelor's degree or foreign equivalent in Business Administration, Computer Science or a related field and at least five (5) years of experience as a computer systems or marketing analyst; must be willing to travel to client sites Monday-Friday. Must have proof of legal authority to work in the United States. Salary Range: $64,002-$80,000 per year. If interested, submit resume in duplicate to: Ms. L. Anne Keller, Senior Associate - Human Resources, NIIT (USA), Inc., 1050 Crown Pointe Parkway, Suite 900, Atlanta, Georgia 30338

DATABASE ADMINISTRATOR to provide database administration in Oracle for Oracle Financials applications running on HP 9000/HP-UX/Solaris/Digital UNIX/IBM AIX and Windows NT operating systems; design the logical data model based on user requirements; conversion of legacy and non-Oracle database systems from VAX/VMS to Oracle systems; perform backup/recovery operations with tools such as Legato, ArcServer and SOL Backtrack; production support, maintenance, testing, implementation and upgrade support in Oracle; design Internet based applications; design and implement telemarketing Oracle data warehouse and Oracle Financials data models. Require: Bachelors (or equivalent) in Computer Science/Information Systems and four years experience in the job offered 40% travel required to customer locations within the United States Salary: $75,000 per year, 8:30 am to 5:30 pm, M-F Apply with resume to. President, Softscape America, Inc., 3235 Satellite Blvd., Bldg. 400, Suite 300, Duluth, GA 30096.

Full-time Senior Business Systems Analyst. Responsibilities include: Manage the design and development of On-line banking and Internet banking applications for the banking and financial services industries utilizing Visual Basic, Java, HTML, C and Visio Professional; serve as ongoing liaison between programmer analysts and business units (clients) to define project requirements; develop functional requirements documents and assist in the development of technical design documents; work with the Quality Control Department to ensure that business systems function as designed; facilitate design meetings and prepare project status reports; develop project plans and define staffing requirements. Must have a Bachelor's degree and three years of experience as a business systems analyst. Experience must have included the design, development and implementation of applications for the banking and financial services industries requiring skills for business analysis, functional design and development, construction of data and process flow diagrams, data modeling and entity-relationship diagrams. Must have proof of legal authorization to work in the United States without employer limitation. Salary Range: $61,381.00 - $75,000.00 per year. If interested, contact: Ms. Patti Plcuff, Human Resources Generalist, CheckFree Corporation, 4411 East Jones Bridge Road, Norcross, Georgia 30092

Software Engineer: Philadelphia; Analyze/design/devlp applications in multi-user environ for pharmaceutical & environmental industry using Oracle RDBMS & Oracle suite of develpmnt tools. Create query features using SQL/SQR. Launch/maintain applications in Unix, Windows NT, Novell environ. Administer d/base & maintain HP 4000 server running HP UX. Recommend modifications to server & config server as per client requirmnts & in conjunction with h/ware. Maintain systems linked to gas chromatograph & ion chromatograph. Prepare help manuals & coord installation of applications. Req: Masters in Comp. Sci or Engg or Maths or Equivalent + 2 yrs exp on job. Exp gained while completing Masters degree is acceptable. $75K/yr, 40hrs/wk, 9a-5p. Submit resume or CV to The Phila. Job Bank, 444 N. 3rd St. - 3rd Fl., Philadelphia, PA 19123 indicating Job Order # 7049230.

SYSTEMS ENGINEER III/APPLICATION DEVELOPER. Responsible for development of custom features for image and workflow application, commercial credit rollout application and corporate compliance management application; development of real estate risk assessment application; migration of 16 bit to 32 bit VB environments; Oracle, Access and Sybase table design and Internet/Intranet implementations. 40 hrs per week. 8 am-5 pm. $60,000 per year. Located in Charlotte, NC. Requires: A Bachelor** or Foreign Degree equivalent in Computer Science or related field and 5 years experience** in the job offered or 5 years related experience as an Application Developer. **Equivalent to a Masters Degree plus 2 years of experience. Send resume to Bank of America/NationsBank Corporation, 800 Market Street, MO1-800-03-01, St. Louis, MO 63366, Job code - 98-0006613, ATTN: Robyn Miller, Technical Recruiter.

Database Analyst - Mcleansville, NC - Analyze user reqs, design, develop, test, implement & maintain information & financial sys using ORACLE, PL/SQL & Pro*C on UNIX based systems. Tune & monitor database performance. M-F, 8AM-5PM, 40 hrs/wk, $62,400yr. Req: Bach in Comp. Sci., Math or Bus. Admin. (Commerce) & 2 yrs exp. Send resume with SS# to: Job Service, 2005B S. Elm-Eugene St., Greensboro, NC 27406 JO# NC4009572, DOT code 030.162-014

Senior Technical Advisor: Provide technical support to internal and external clients on PowerHouse, InterBase and UNIX Administration. Analyze database performance issues, develop technical training material and teach classes on a regular basis both on and off-site. Install application and database software on client's computer, install desktop tools from Cognos on clients' PCs. Assist clients with application software upgrade, develop and assist clients with custom programs including PowerHouse code and UNIX Shell Scripts. Knowledge of: PowerHouse, UNIX, Shell Script Programming, System Administration, Relational Databases, Interbase and Oracle. B.S. or Foreign Equivalent in Computer Science AND 2 yrs. exp. OR 2 yrs. exp as a Support Specialist, UNIX AND HP Support. M-F, 9-5, 40hrs/wk, $80,000/yr. Send 2 Resumes/letters of application to: Case # 81412 PO Box 8968 Boston, MA 02114.

APPLICATIONS DEVELOPER: To develop, enhance and maintain multi-tiered client/server applications for PC-based clients developed under UNIX environment. Responsibilities include project scoping with clients, graphic user interface design, system design, database design, functionality implementation, building of shared libraries, system integration, documentation, maintenance and customer support. Requires: B.S. in Computer Science. Knowledge of UNIX, C, SQL, RCS and/or CVS project development tool, object-oriented programming, databases, graphic user interface software, compiler construction and ability in PC hardware. 40 hrs/wk (9:00 a.m. to 5:00 p.m.); $58,000/yr. Send two (2) resumes/respond to: Case #81257, PO Box 8968, Boston, MA 02114.

Programmer Analyst, Lowell, MA: Design, analyze, develop and implement applications using Visual Basic, Access and Excel. Design, develop and implement specific applications using Dataware's CD Author and CD-Answer. Develop Multimedia applications using Macromedia Director, X-Res, Authorware, Extreme 3D and Adobe Premiere. Req'd. Bachelors in Engineering or Comp. Scie. 2 yrs exp in job offered. 40 hrs/wk., 9a-6p, $57,000/Yr. Applicants should submit two (2) copies of his/her resume in response to: Case #80638, P. O, Box 8968, Boston, MA 02114.

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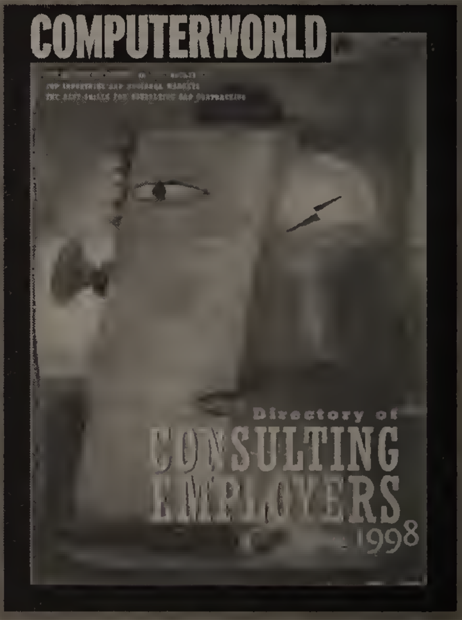

computerworldcareers.com

COMPUTERWORLD CAREERS

Solar & Stellar Physics Division Computer Specialist sought to participate in a program utilizing scientific instrumentation on a satellite in orbit one million miles from earth, and participates in the planning for instrumentation on future space missions. Will be responsible for performing all aspects of the software life cycle including: Test and maintenance of existing software; design, implementation and test of new software or software features, documentation of new and existing software; installation and operations of all instrument software. Instrument software includes flight, ground and mission operation software and data processing/analysis software. Flight software is resident in instrument controllers on space platforms. In addition, candidate will participate in data reduction and scientific analysis of observational data, and development of spectroscopic diagnostic techniques. Will develop state-of-the-art three dimensional model codes and displays of the observed extended atmosphere of the Sun and also model its time evolution. Candidate will independently pursue a program of research on the development of 3-Dimensional models of the extended solar corona and displays of the time evolution of the corona using tomographic analytical techniques. Develop advance concepts of automation and information processing display, control and transfer. Prepare papers for publication describing and documenting results and their interpretation. In addition, candidate will develop the requirements for new and revised mission software, and the environment in which it will operate. Candidate will translate these requirements into working, tested, documented production software and integrate it with the Experiment Operation Facility Core System. Candidate will maintain subcontractor developed flight software including documentation, as well as add new features, fix bugs and design, develop and test modification. Candidate will manage network of work stations at sight of spacecraft operations center as required. Assists in the selection, training and oversight of computer software specialists. Will be responsible for software configuration management, quality control and overall systems management and integration. Will utilize knowledge of tomographic analytical techniques to develop 3-Dimensional models and visual displays. Will utilize knowledge of numerical methods and their efficient implementation in computer software for the solution of complex computer systems problems and scientific problems. Master of Science in Physics + 2 yrs/exp as a Computer Specialist. Such experience must include: 1) Knowledge of tomographic analytical techniques. Knowledge of numerical methods and of their efficient implementation in computer software for the solution of complex computer systems problems and scientific problems. 2) Ability to design, code, test, integrate, install, operate, maintain and document complex software systems. Will be required to write/maintain real-time and non-real-time software using C, C++, Intel I-86 Assembly language, FORTRAN, MS-DOS, UNIX, TCL/TK and MOTIF/OPEN LOOK. Hours: 40/wk Salary: $55,068/yr. Send 2 resumes to: Case #: 81323, PO Box #8968, Boston, MA 02114.

SOFTWARE ENGINEER to provide on-site consultancy in complete life cycle design and development of applications from concept to configuration; design of multi-tier client/server applications using pure object oriented development and design tools using PowerBuilder, PowerDesigner, Java on Windows 95/NT platform; database tools using Oracle and Sybase; object oriented methodologies using C/C++; stored procedure development using Developer 2000 and Pro*C; middle tier development on HP-UNIX using Java and various other object oriented concepts. Require B.S. in Electronics Engineering/Computer Science and three years experience in the job offered or as Analyst/Programmer. 40% travel required to customer locations within the United States. Salary: $65,000 per year, 8:30 am to 5:30 pm, M-F. Apply with resume to: President, Softscape America, Inc., 3235 Satellite Blvd., Bldg. 400, Suite 300, Duluth, GA 30096.

Object Design

Join the leading provider of data management solutions for Java, C++ and XML applications!

Systems Engineers

Supporting the sale of ObjectStore, eXcelon, associated tools and services, you will conduct technical product presentations and demonstrations. Successful candidates will develop sales strategies with account managers, assist in architectural reviews, and develop proof of concept and benchmark applications. Minimum requirements are a BS in Computer Science or Engineering or equivalent, 2+ years of commercial programming experience, including 1 year of C++, Java or ActiveX and a strong understanding of OO and database concepts. Some positions require a Master's degree and/or additional experience. Opportunities exist in Burlington, MA and other major cities nationally. 25% travel involved. *Job Code: SE*

Consulting Engineers

Challenging opportunities exist in Burlington, MA and other major cities nationally for skilled professionals to assist customers in the design/development of a variety of ObjectStore applications. Using our Object Design product suite, you will design, develop and implement various Internet/Intranet, C++ and Java applications. The minimum requirements are a BS in Computer Science or Engineering and 3+ years of software engineering experience with large scale C++ language-based software systems. Candidates must have experience with formal OOA and OOD methodology, deploying software for multiple platforms. Some positions require a Master's degree and/or additional experience. Proficiency with C++ and/or Java OO programming language essential. Significant travel required. *Job Code: CE*

Software Engineers/Senior Software Engineers

In this challenging role, you will participate in porting, testing and maintaining the ObjectStore and eXcelon database systems and tools on Windows NT/95 and UNIX. BS in Computer Science or Engineering required as well as strong C++ and/or GUI skills and 2+ years of experience developing/maintaining C++ systems. Experience with COM/OLE/ActiveX, MFC, installShield, tcl, perl or ClearCase is a plus. Senior positions require a Master's degree and/or additional experience. Based in Burlington, MA. *Job Code: SSE*

Project Manager

Directing the overall product life cycle, you will manage Object Design's third party tools and integration products. Successful candidate will perform product planning and scheduling, and oversee Alpha/Beta programs. Supporting product marketing and PR in product roll-out, you will provide direct sales force training. You will also work with partners to bring third product integrations to market. This position requires a professional with a technical and business background who has a track record of success building and shipping product as an engineer or project manager as well as managing technical and marketing relationships with outside vendors. Knowledge/experience in Object Oriented software development, database application development and internet application development issues desired. Minimum requirements are a BS in Computer Science or Engineering, or equivalent, and 5 years of industry experience. *Job Code: PM*

We offer competitive salaries and benefits, and opportunities for advancement. For consideration, forward your resume and salary requirements, indicating proper code, to:
Object Design, Inc.,
25 Mall Road,
Burlington, MA 01803;
or FAX (781) 674-5218.

Object Design is an Equal Opportunity Employer.

OBJECT DESIGN

www.objectdesign.com

COMPUTER SYSTEMS MANAGER DATABASE ADMINISTRATOR (DBA)

DEPARTMENT OF ENVIRONMENTAL PROTECTION BUREAU OF CUSTOMER & CONSERVATION SERVICES

The New York City Department of Environmental Protection seeks a data base administrator with extensive computer experience. The DBA will be responsible for managing a staff of 4 technical professionals in defining and maintaining DB2 tables, data bases and objects for the DEP's Customer Information System (CIS). CIS is operated in an MVS/CICS/DB2 environment. Additionally, the DBA will monitor the application's performance and system resources, and will implement actions to ensure that they are performing optimally. Also, the DBA will define and implement backup and recovery procedures, and assist the programming staff with SQL coding.

Applicants should have a minimum of 5 years of mainframe DB2 data base administration and management experience in a CICS environment. Also, applicants should be able to invoke, monitor and control DB2 utilities such as Runstats, Reorgs, Check, Loads and Unloads, and be familiar with performance monitoring tools such as Omegamon/DB2.

Excellent verbal and written communication skills are also required.

Salary will be commensurate with experience and education.

All interested candidates must submit 3 copies of their resume and salary history to:

ZoeAnn Campbell
1st Deputy Director of Human Resources Management
NYC Department of Environmental Protection
59-17 Junction Blvd., 18th Floor
Corona, NY 11368-5107

The NYC Dept of Environmental Protection is an EOE (M/F)

Joel A. Miele Sr., P.E., Commissioner

The City of New York

IT Professionals

Peterson Worldwide LLC has exciting opportunities to join our rapidly expanding systems team in positions offering potential for growth and responsibility.

SOFTWARE DEVELOPMENT MANAGER

Qualified candidates must have 5+ years of strong management and technical experience in the following areas: Client/Server technology; Financial and project management applications; Managing & developing platforms e.g.: Lotus Notes, Visual Basic, Crystal Reports, etc.; Planning/managing large-scale software development and system integration full cycle projects; System methodologies; Working knowledge of various e-mail packages, business solutions, and various types of software applications including Visual Basic 4.0/5.0, Oracle 7.x, Oracle; Application 11.x, C++, Access, etc; WEB solutions, Imaging, Data Security; Operating Environments-Windows NT, Windows 95/98, UNIX, etc; Networking environments-Windows NT, NetWare 4.11, etc; Data Security and Data Mining a plus.

You will manage and lead a team of professionals firmwide. Candidates must possess strong business process orientation, hands-on Client/Server technology, a background in database-oriented systems and excellent verbal/written communication skills. They will be working in a demanding, fast-paced environment where teamwork and creativity are encouraged. Flexibility with regard to travel and overtime are required.

TECHNICAL MANAGERS & SR/JR LAN/WAN ENGINEERS

Qualified candidates will have 3-5 yrs of hands-on Network experience in a LAN/WAN environment. They must be able to support & manage networks consisting of Novell NetWare 4.11; Windows NT; Lotus Notes and Citrix Winframe Servers. Support and maintenance of Dial-in access and Internet access is also required, as is the design, set up and upgrade of new and existing servers. Candidates must possess a strong working knowledge of Windows 95; Winframe; Office 97, Lotus Noes 4.5 and communications software. Any other application is a plus.

Candidates for IT positions should be organized and self-motivated and possess excellent interpersonal and communication skills. Flexibility with regard to overtime and extensive travel is a must.

You will be a member of the **Princeton office,** but travel to other offices and client sites would be required. We offer competitive salaries, employee stock plan; merit-based annual bonuses and a comprehensive benefits package.

Send resume with salary history indicating position of interest to:

Peterson Worldwide LLC
IT Department (LM)
993 Lenox Drive, Suite 207
Lawrenceville, NJ 08648
Email: resumes@pcit.com

Peterson Worldwide

We will reply only to those selected for interviews. No phone calls please. EOE

Software Engineer. Design and develop commercial software applications for 16-bit and 32-bit Windows environments. Use VB or VC++ using MFC, Windows SDK, DLLs, VBX, or OCXs. Use multiple threading, multiple document interface, fonts, colors, graphics, printing, multimedia, and communications and networking. Configure tools such as PVCS or Source Safe. Use ODBC, triggers and stored procedures using database systems such as MS SQL Server, MS Access, Sybase SQL Server, or Oracle. Demonstrated ability designing and coding 16-bit and 32-bit Microsoft Windows-based GUIs. Demonstrated ability using advanced Windows features. Demonstrated ability in Windows development tools using debuggers, source code configuration tools. $63,000/yr 40 hr/wk. 9 a.m - 5 p.m. Must have 2 yrs. exp. (or 2 yrs. Exp. rel occup. of Systems Analyst) and B.S. Comp. Sci. rel. field/equiv. Send 2 resumes: Case #81353, P.O. Box 8968, Boston, MA 02114.

Assoc Director of Information Services

Ross University seeks a candidate w/min of 5yrs exp in appl software design & programming, as well as background in network & hardware admin. Must have experience in managing and supervising an IS dept. Should have programming exp in MS Access & one of the following langs: Basic, Visual Basic, Paradox, DBase, or PowerBuilder. Exp working in an academic environ utilizing the Datatel software pkge a+. Should have working knowl of NT/Back Office, Win 95, firewalls, PC/Server configs & diag exp, w/a full understanding of lan/wan security, NT domains, trusts, vpn & ras

Resumes to: Michelle Freed
ROSS UNIVERSITY
460 W 34th Street, 12th Fl
New York, NY 10001
Fax: 212 629-3147 or 268-7767

Software Engineer: Research, design, develop comp software systems for variety of apps applying principles/techniques of comp sci, engineering, mathematical analysis. Analyze software req, determine feasibility of design within cost/time parameters. Consult w/ other engineers to evaluate overall hardware interface, operational/performance req. Formulate/design software systems using scientific analysis/mathematical models to predict/measure outcome. Direct/develop testing, programming, documentation, implementation. Consult w/client, apply exp w/ Database Mgmt Systems. Job is in Miami, FL + client sites in Miami, FL geographical area. Req: Master's in Comp Sci, Applied Mathematics or related field + 2yrs exp or 2yrs as Computer Programmer. $57,007.60/yr, 40 hrs, 9am-6pm. Submit resume to: Bureau of Workforce Program Support, P.O. Box 10869, Tallahassee, FL 32302-0869. Re: JO#-FL 1944622.

Computer

At Lucent Technologies, we're defining the future of telecommunications. We're currently looking for individuals with an MS and/or 1-2 years of directly related experience in: Software Development, Software Engineering, Database Engineering, Software Architecture, Software Testing, System Administration & Integration, Electrical Engineering, and RF Engineering. We seek experience in the following: CDMA, C/C++/UNIX, Switching Technology, RDBMS, GUI Design, Internet/Network Protocols, Wireless Telecommunications, Software Tools, Object Oriented Methodologies/Small Talk.

Please send your resume to: Lucent Technologies, Inc., Scanning Operations, Attn: 63/050-399/ND, 283 King George Road, Warren, NJ 07059. EOE

Senior Software Engineer: Design, develop & enhance a seamless, integrated Year 2000 solution for client application; Position requires analysis, remediation, testing & maintenance of the Year 2000 solution for various programming languages including COBOL, Natural, PL/1, VSAM, IMS, and IDMS. Provide technical guidance to junior programmer analysts and software engineers. Integrate technical skills ranging from through knowledge of compiler theory and artificial intelligence to script programming. Use of Perl and Unix scripting in Solaris environment as well as mainframe languages to address the year 2000 problem are required. Work with COBOL and C/C++, Prolog and ML languages and environments. B.S. in Computer Sciences with 6 months exp. or job offer in software development. Candidate must be proficient in C, C++ Prolog, ML, Perl and Unix Scripting. Strong COBOL analysis skill. 40 hrs/wk, 8:00 am-5:00 pm, $50,000yr, JO # NC2616506 & DOT code 030.062-010. Send resume w/ss# to the nearest Job Service office or Job Service 500 W. Trade Street, Charlotte, NC 28202.

Microcomputer Support Specialist. design, plan, test, and trouble shoot new electronic circuit boards for use in the computer, develop work goals, and department projects; analyze resolve electronic board problems in computer hardware, maintain and monitor electronic circuit boards that are installed on site in computer hardware for customer; develop, test and monitor new electronic components to upgrade computer hardware and equipment coordinate the communication between the US companies and Asian manufacturers. Must have MS degree or equivalent in EE or CS, must be able to design high frequency video circuit, monitor circuits and analog circuit 40 hr week 9am-5pm. $44 000 00 year Send resume to Hong Video Technology, Inc. Human Resources Dept PO Box 160, Duluth Georgia 30096 Fax (770) 495-4885

Systems Designer/Team Leader wanted by S/ware Dvlpmt, Servicing & Mktg Co. in Greenwich, CT for Milford, MA job location. Must have MS in Comp Sci and 1 yr exp dsgng, dvlpg, testing & maintaining systm s/ware. Respond by resume to: HR Dept, River Run Software Group, Inc, 8 Greenwich Office Park, Greenwich, CT 06831.

Programmer/Analyst (Herndon, Va; Cranford, NJ & other client sites) Consult w/clients & evaluate their computer requirements. Plan, test, develop & test client/server applications & various software modules; prepare documentation; provide technical support in integration & system testing. Environment: Unix; Unix Open Windows; shell scripts; C Shell; C++. B.S. in Comp. Sci or Math or Engg +2 yrs exp. in job off'd or as Software Engineer $69K/yr, 40 hrs/wk, 9-5. Send 2 resumes w/ad copy to VEC#05, VA-8044272; 3751 Nine Mile Rd, Ste C; Richmond VA 23223.

Database Administrator, Waltham, MA: Analyze, design and develop applications on 3-tier Architecture using Oracle. Develop database using Oracle replication techniques and Forte application server. Perform SQL, application and kernel tuning on Unix. Perform data model designing using case tool Designer 2000 and maintain the repository. Req'd Masters in Engg. or Comp.Scie. or Math. 1 yr exp in job offered. 40 hrs/wk., 9a-6p, $70,000/Yr. Applicants should submit two (2) copies of his/her resume in response to: Case #19981422, P. O. Box 8968, Boston, MA 02114.

Programmer Analyst needed F/T by Operation & Software Development Co. in Denville, NJ, to analyze & prgm statistical analysis s/ware using SAS, PL/I & Syncsort on IBM Mainframe & dsgn statistical model & d/base using Access, Excel and Cobol. Must have Bach in Applied Statistics or Comp Sci. Respond to: HR Dept., Advanced Technology Decisions, Inc., 22 North Ridge Rd., Denville, NJ 07834.

Software Engineer needed by Marketing & Communications Co. in Morristown, NJ., to analyze, dsgn & dvlp comp s/ware using Rational Rose, C/C++ & Visual Basic in UNIX and Windows envrmt; and to dvlp internet/intranet applics using HTML & JAVA. Must have Masters in Comp Sci, Comp Engg or Elec. Engg. Respond by resume to: HR Dept, DVC Interactive, Inc, 10 Park Ave, Morristown, NJ 07960.

Programmer Analyst needed by Computer Design & Consulting Co. in Cranberry, NJ. Must have Bach. in Comp Sci, any Engg field or Math and 1 yr exp dvlpg communication s/ware & APIs to N/work Mgmt Systms for telecom switches and dsgng & dvlpg interface to IVR systms, Service Mgmt Systms, billing systms, Web based care systm for telecom using VB, InterDev & SQL Server. Respond to: HR Dept, Trish USA Corp, 379 Princeton Hightstown Rd, Cranberry, NJ 08512

System Administrators needed for NJ IT Co. Must have exp w/systm admin, installation, maintenance of servers/workstations. Apply to Global Consultants, 601 Jeffeson Rd, Parsippany, NJ 07054.

Computer Programmer with 2 years experience in installing, customizing and integrating software on AS/400. Design or create application for payroll implementation including creation of library or database packages. Minimum Bachelor's degree in computer science or equivalent or related field. Education may be domestic or foreign and may be education equivalency. The job may be performed at client locations nationwide. Send resume to ACS International Resources, 5700 Kirkwood Hwy., Suite 201, Wilmington DE 19808.

Software Specialist II needed F/T by Sharon, MA Co. involved in S/ware Dvlpmt. Must have Masters in Engg, Comp Sci or related field & 3 yrs exp in software engg. BS + 5 yrs exp in related occup also accepted. Respond to: HR Dept, Clearwater Technologies, Inc, 92 Furnace St, Sharon, MA 02607.

Patel Consultants Corporation, an IT Co. in Nashville, TN, is looking to fill the following positions:

1. Senior Programmer Analyst - w/3 yrs exp in Oracle dvlpmt for info systms using PL/SQL & Pro*C and using Developer 2000 in UNIX envrmt. Must have BS in Comp Sci or Engg.
2. Programmer Analyst - w/2 yrs exp performing user analysis & write detailed specs; working in an Oracle envrmt dvlpg customized comm'l s/ware in UNIX & dsgng & dvlpg GUI tool using Developer 2000 (SQL*Forms 4.5 & SQL*Report Writer 2.5). BS in Comp Sci req'd.

Respond to: HR Dept, Patel Consultants Corporation, 1005 Murfreesboro Rd, Ste 201, Nashville, TN 37217.

Systems Analyst needed by Computer Consulting/System Integration Co. in Whippany, NJ. Must have 2 yrs software and networks analysis, design, and integration exp. Bachelors in Finance, Comp Sci or Elec Engg req'd. Respond to: HR Dept, UCA Computer Systems, Inc, 9 Whippany Rd, 12A, Whippany, NJ 07981.

Telecommunications Engineer with BS in Electrical Engineering Technology or Electrical Engineering to design and write telecommunications specifications and schematics for telephone and other telecommunications systems and equipment for use by telecommunications engineers and technicians. Hrs: 8:00 a.m. - 5:00 p.m. Mon-Fri. Salary: $41,000/yr. Location: Duluth, GA. Apply to Mr. J. Reynolds Barnes, COO, Telcor Communications, Inc., 3400 River Green Court Duluth, GA 30136

SOFTWARE ENGINEER to design, develop, test, implement, monitor and fine-tune software systems and databases in a large-scale ERP environment using SAP, SAP Basis Module, Oracle, SQL Server, CCMS, ALE, RFC, IDOC and TCP/IP under Windows NT and UNIX operating systems. Require: M.S. degree in Computer Science, an Engineering discipline, or a closely related field, with 1 year of experience in the job offered; Extensive travel on assignments to various client sites within the U.S. is required. Salary: $70,000 per year, 8:00 am to 5:00 pm, M-F. Apply by resume to: Sam Bharath, President, Netserve Applications Inc., 1410 Bittercress Court, Alpharetta, GA 30005; Attn: Job VC

SOFTWARE ENGINEER to design, develop, test, implement, maintain and support application software using C + +, Rational Rose and OMT techniques, Rogue Wave libraries, Motif, tools.h+ +, xdb, dbx, Sun Workshop, purify, quantify, make, CMVC and System V IPC on HP-UX and Sun UNIX platforms. Require: M.S. degree in Computer Science, an Engineering discipline, or a closely related field, with two years of experience in the job offered; Extensive travel on assignments to various client sites within the U.S. is required. Salary: $70,000 per year, 8:00 am to 5:00 pm, M-F. Apply by resume to: Roz L. Alford, CEO, A.S.A.P. Staffing, LLC, 3495 Buford Hwy., Duluth, GA 30097; Attn: Job SP

Software Engineer needed in Jacksonville, FL to design and develop software programs for customer services using C/C++, Java on Solaris, UNIX and Windows Environment. Also maintain existing software programs. Must have BS in CS or EE + 6 mos. exp. M-F 8-4:30 $61K. Send resume to Bureau of Workforce Program Support, FL-1945928, P.O. Box 10869, Tallahassee, FL 32302-0869.

Programmer/Analyst: Perform Structured Sys Analysis & design, develop, test & implement workflow applications in multi HW/multi SW environ. Perform database mgmt & sys admin using Fourth Generation Lang (4GLS) & GUI (Graphical User Interface) Front-end tools. Design & develop mission critical client-server sys & Web based applications. Utilize C/C++, Java, SQL, DBMS, DB2, RDB, Lotus Notes, Oracle Notes, Pump, Domino Server, Net. Data & Java Script. Req's Master's degree in Comp. Sci. or Engr'g & 1 yr exp as Prog/Anal. $60,000/yr. Send resume to: Phil. Job Bank, 444 N. 3rd St., 3rd Fl, Phila. PA 19123. Refer to Job Order #5024420.

Programmer/Analyst: Perform structured sys analysis & design, develop & test implement complex workflow applications in a multi HW/multi SW environ. Perform database mgmt & sys admin using Fourth Generation Lang (4GLS) & Intranet & Internet based applications. Utilize C, C++, Java, Java Script, SQL, RDBMS, Lotus Notes, Oracle, Notrix, Domino Server, PowerBuilder & Visual Basic. Must have Master's degree in Comp. Sci. or Engr'g & 1 yr exp as Prog/Anal. $80,000/yr. Send resume to: Phila. Job Bank, 444 N. 3rd St., 3rd Fl, Phila. PA 19123, Refer to Job Order # 6024473

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Systems/Analyst (Varying job sites throughout the United States). Conversion of mainframe systems to client server based financial analysis systems, using SQL loader. Analysis, design and development of ORACLE RDBMS and associated development of SQL and PL/SQL for financial applications under UNIX operating system. $67,000/yr, 40 hrs/wk Mon - Fri. 9am - 5pm. REQD: 2 yrs exp. in job offered. "Apply at the Texas Workforce Commission, Dallas, Texas, or send resume to 1117 Trinity, Room 424T, Austin, TX 78701, JO# TX0480806". "AD PAID BY AN EQUAL OPPORTUNITY EMPLOYER"

Clipper/Foxpro Programmer Analyst at NOS COMMUNICATIONS in Las Vegas Applicant MUST have 2+ years experience developing and maintaining multi-user applications utilizing CLIPPER 5.2 and/or Foxpro 2.6 and up. Teamworking in DOS and Novell/NT. Windows development and other languages a plus. Salary based on experience. Full benefits, 401K. Fax resume with salary history and references to the IS Dept. at 702-547-8593. EOE

Multiple openings for Software Engineer to design, develop, implement & migrate business applications relating to financial/manufacturing in a UNIX, Novell Netware and Windows NT environment using ORACLE as a relational database management system. Re-engineer legacy applications to client server architecture using generic algorithms, Object Oriented Technology (OOT)/C++ and Pro*C. Utilize GUI tools such as Developer 2000/Designer 2000 in the design and development process. Utilize SQL query optimization and PL/SQL for data loading/aggregation. Provide technical support. Min Req: Bachelors in Comp.Sci or equivalent + 5 years of progressive work exp. or M.S. in Comp. Sc. or equivalent + 2 years of progressive work exp. Applicants must document 2+ yrs. of exp. in use of UNIX, Novell Netware, C++, Pro*C, Oracle & Developer 2000/ Designer 2000. Salary: 80,000/yr., 40 hrs/wk., high mobility. Must have proof of legal authority to work in the U.S. Send Resume to: Primetech Systems, Inc., 1010 Green Tree Road, Pittsburgh, PA 15220.

Sr. Programmer/Analyst sought to analyze business requirements; translate them into application detail specifications; and develop test, and implement applications according to these specifications for clients in a client/server environment. Bachelors or equivalent in Computer Science, Engineering or a related field + 2 yrs/exp in Job Offered or 2 yrs/exp in developing applications in PowerBuilder. Such experience must include PowerBuilder and Sybase. Applicant must be willing to travel to various client sites throughout the U.S. Hours: 40/wk Salary: $60,000/yr. Please send 2 resumes to: Case #: 81369, PO Box # 8968, Boston, MA 02114.

PROGRAMMER ANALYSTS required. Design, coding and testing of mainframe applications using COBOL, DB2 and the mainframe's Customer Information and Control System (CICS). Three years of experience required in the job duties described above. Must have proof of legal authority to work in the U.S. Salary: $58,000/ year for a 40-hour work week. Interested applicants send resume to: Shirley Gregory, Missouri Division of Employment Security, 1411 Main Street, Kansas City, MO 64105. The Job Order # for the Job Opportunity is 154-031. Ad paid by an Equal Opportunity Employer.

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Hardware/Firmware Engineers: Conduct research & development of next generation of high-performance parts for computer systems. Exp. and/or background in the following areas (not all req.): analog/digital circuit design and simulation (such as layout & timing of CMOS circuits hardware Synthesis FPGA and ASIC & custom design implementations, and board design utilizing tools such as ViewLogic), C/C++ programming PC interface signal processing statistics and electronic instrumentation. Req: MS in EE/Comp Eng + 1, 2 or 3 yrs exp (or equivalent) depend on position or B.S. + 3-5 yrs exp depend on position in Austin, TX, San Jose, CA, Hawthorne or Yorktown Heights, NY, Endicott, NY. Competitive salary. Please send resume w/clipping of ad to: IBM Corporation, Technical Recruiting, Job Code CW116, P.O. Box 218, Yorktown Heights, NY 10598. An equal opportunity employer.

Needed System Analyst to analyze, design, develop, test & implement computer software applications on/for a variety of business applications in a MVS/ ESA, UNIX environment using IDMS & ORACLE/ SYBASE as relational database management system. Re-engineer legacy system using GUI tools & techniques, utilize ADS/O & Information in design & development process on mainframe machines, PI-OPEN & PC environment, enhance & modify documents & provide user training/ support. Min. Req: Bachelor of Sc. in Computers, or its equivalent & 5+ yrs. of progressive work exp. or M.S. in Computers, or its equivalent, & 2+ yrs. of progressive work exp. Must have 2+ yrs. of exp. in use of Mainframe Databases, Oracle, Sybase & PI-OPEN, Salary: $75,000/yr., 40 hrs/wk., high mobility. Must have proof of legal authority to work in the U.S. Mail resume attn. Som Bbattacharya, System Edge (USA), LLC., 811 Saffert St., Philadelphia, PA 19128.

Multiple openings for Software Engineer to design, develop & implement systems & business applications in UNIX/ Windows environment using ORACLE as a relational database management system, Re-engineer existing applications using generic algorithms & Object Oriented Technology including C++. Utilize GUI tools such as Visual C++ in the design and development process. Implement data modeling using proprietary case tools such as Rational Rose. Utilize SQL query optimization and PL/SQL for data loading/ aggregation, Min Req: Bachelors of Comp. Sc. or equivalent + 5 yrs. of progressive exp. or M. S. in Comp.Sc. or equivalent + 2 years of exp. Must have 2 yrs. of exp. in use of UNIX, Oracle, C++, Visual C++. Salary: 80,000/yr., 40 hrs/wk., high mobility. Must have proof of legal authority to work in the U.S. Send Resume to: Primetech Systems, Inc., 1010 Green Tree Road, Pittsburgh, PA 15220.

SOFTWARE ENGINEER: Perform Object-Oriented analysis and design real-time, multithreaded client/server software systems using Object Modeling Technique (OMT) with C++ language on OS/2 platform. Implement multithreaded software using semaphore and mutex techniques with C++ compiler. Design and access relational database using Structured Query Language (SQL). Requires a Master's degree in Computer Science or Management Information Systems (MIS) or Engineering and one year experience in job offered. 40 hour work week. $61,336 per year. Apply at the Texas Workforce Commission, Fort Worth, Texas, or send resume to the Texas Workforce Commission, 1117 Trinity. Room 424T. Austin, Texas 78701, J,O.# TX0520216. Ad Paid by An Equal Opportunity Employer.

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Software Engineers: Conduct research & develop. test & maintain programs, which comprise a portion of a system product or future products. Exp &/or background in the following areas (not all req): relational database systems, database management systems, distributed management and recovery techniques, TCP/IP, Socket IPC, C, C++, SQL, AIX, UNIX, JAVA, object-oriented programming languages, Lotus Notes. Windows (95, 98, NT) operating systems, data security, Internet/ Intranet applications, graphical user interfaces, object-oriented analysis and design techniques, domain modeling techniques, version management, configuration management. Req: MS in CS/Math/EE/Comp Eng + 1, 2 or 3 yrs exp (or equivalent) depend on position or B.S. + 3-5 yrs exp depend on position in Austin, TX. San Jose, CA. Hawthorne or Yorktown Heights. NY, Endicott, NY. Competitive salary Please send resume w/clipping of ad to: IBM Corporation, Technical Recruiting, Job Code CW115. P.O. Box 218. Yorktown Heights, NY 10598. An equal opportunity employer.

Senior Software Engineering Consultant, (St. Louis, MO). Ensure overall technical quality and design leadership for programmers and analysts across the full life cycle of systems development projects involving use of Visual Basic and Visual C++ client applications connecting to Oracle 8 or Essbase databases running on Sun E series UNIX servers. Utilize custom built middleware comprised of Pro*C and PL/SQL modules, and batch routines using Pro*C, C++ and Kornshell programming Supervise all design reviews involving application development team and ensure that robust systems development methodology is strictly enforced. Aide production support and quality assurance testing personnel in identifying and resolving system incidents and monitoring system stability. Support the execution of architecture, data architecture, and operations architecture teams. Requires Master's degree in Computer Science, Engineering, Mathematics, Information Systems or a related field or the equivalent. Employer considers a Bachelor's degree in any of the fields listed plus 5 years of progressive, related experience to be equivalent. Requires 1 year experience in the job offered or 1 year experience in the related occupation of Software Engineering Consultant. One year experience in related occupation must include full lifecycle software development/design using Visual Basic, Visual C++, Pro*C, PL Sequel, Oracle 8.0.1, and Essbase, as well as UNIX and Kornshell programming. 40 hr/wk; 8:00 a.m. - 5:00 p.m.; $83,000 per year. Send resume or letter, in duplicate to Ms. J. Gaston, Division of Employment Security, 13131 New Halls Ferry Road, Florissant, MO 63033. Refer to Job Number 156302.

Lead SAP Finance Analyst (Dallas, TX): Implement SAP software by analyzing business requirements definitions and financial requirements for business processes; present alternatives for process redesign; map business and financial requirements to SAP; identify problem areas in the functional or technical implementation of R/3 software; implement SAP to clients' service functions. Implement SAP modules from several business areas in both versions of SAP (R/2 and R/3); apply SAP to financial contexts; advise clients on implications, trade-offs, advantages and disadvantages of specific SAP solutions for their business processes. Must have Bachelor's in any field. Must have 2 yrs exp in the job offered or 2 yrs as an Accountant or Financial Analyst. 2 yrs of exp. must include 6 months SAP project implementation exp. with SAP R/3 FI/CO. OR without Bachelor's degree: must have 5 years exp. as Accountant or Financial Analyst which includes 6 months SAP project implementation exp. with SAP R/3 FI/CO. 40hrs/wk; 9am - 5pm; $115,000/yr. Apply at the Texas Workforce Commission, Dallas, Texas, or send resume to the Texas Workforce Commission, 1117 Trinity. Room 424T, Austin, Texas 78701., J.O. #TX0520244. Ad Paid by An Equal Opportunity Employer.

Software Engineer (2-3 available positions) sought to analyze and research client business processes; design computer databases and associated software applications. Identify required technology and personnel resources; prepare project plans identifying time and cost estimates. Lead and participate in the software development process to build software applications Direct the software testing process and oversee the compilation of system and user documentation Bachelors degree in Computer Science or Engineering + 5 yrs/exp as Software Engineer or 5 yrs/exp in functioning in a Systems Analyst or Programmer/Analyst role. Such experience must include: developing relational databases. PowerBuilder. Oracle, DB2 Must be willing to travel to various client sites throughout the U.S. Hours. 40/wk Salary $64,000/yr. Case #: 81368. PO Box #: 8968. Boston. MA 02114

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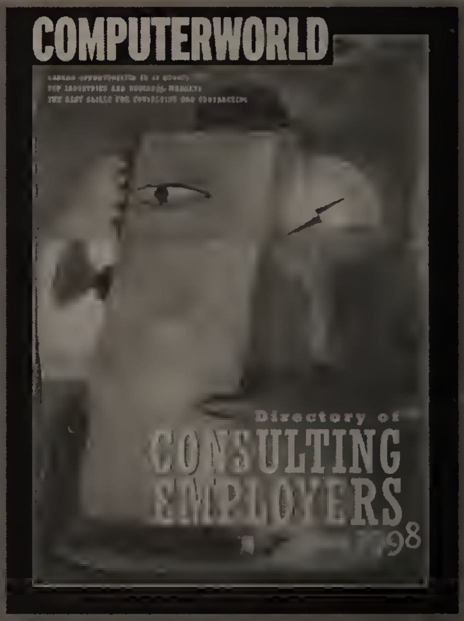

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COMMUNICATIONS NETWORK PROJECT & PUBLIC ADDRESS/CUSTOMER INFORMATION SCREENS PHASE II PROJECT

The New York City Transit Authority is engaged in multi-phased projects to upgrade the NYCT communications network and customer communications systems. The Communications Network will support multiple applications for improving transit service, integrating voice, data and video communication over a single network, utilizing fiber optic cable with Sonet and ATM equipment. An RFP tentatively scheduled for release in 1999.

The Public Address/Customer Information Screens Phase II (PA/CIS) project will provide a modern public address system utilizing microprocessor controlled electronics. CIS units will provide customers with train arrival information along with other relevant announcements. PA/CIS will be a centralized system with secondary remote control locations and will interface with other systems under development including Automatic Train Supervision (ATS), Subway Train & Traffic Information System (STATIS), Communication Based Train Control (CBTC) & PA/CIS Phase I.

NYCT seeks comments on the technical specifications for each of the projects. There is one RFI for both projects as it was conceived as one project and will be split into two distinct projects after the RFI is completed.

Firms possessing the requisite qualifications and desirous of responding can obtain a copy of the Request for Information on or after April 28, 1999 by faxing a request on company letterhead and include RFI number and due date to **(718) 694-4056/4210 or by mail to: MTA New York City Transit, PO BOX 020831, Brooklyn, NY 11202-0831, Attention: Bid Document Requests.** RFI documents may also be obtained in person from the Bid Reception Desk at **130 Livingston St., Brooklyn, NY** between the hours of 9:00 AM-4:00 PM, Monday to Friday except holidays. Responses are requested no later than June 2, 1999. Following the written submission NYCT may choose to meet or correspond with selected RFI respondents for further clarification. This is a Request for Information, not a solicitation.

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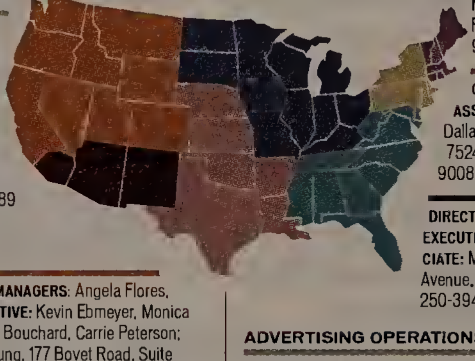

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CBT Group Plc.	18.3

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IBM (H)	5.69
Citrix Systems Inc.	5.69
Fiserv (H)	5.25

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Amazon.com (H)	-18.6
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Applied Materials	-13.3
Cybercash, Inc.	-12.2
Sybase Inc.	-11.7

DOLLAR	
Amazon.com (H)	-38.56
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Yahoo Inc.	-11.88
PSINet Inc.	-9.50
Intuit	-9.13
Applied Materials	-8.19
Altera (H)	-8.19

QUALCOMM'S HIGH-WIRE ACT

Wireless standard sealed with Ericsson

BY MATT HAMBLEN

SAN DIEGO-BASED Qualcomm Inc. (Nasdaq:QCOM) is dazzling investors with its high-wire performance. The 14-year-old wireless communications company recently struck a deal with a competitor on a wireless standard — and doubled its stock price.

INDUSTRY ALMANAC

Qualcomm developed the Code Division Multiple Access (CDMA) standard. CDMA was fought for years by Stockholm-based L. M. Ericsson Telefonaktiebolaget, which pushed a different European wireless standard.

But March 25, the companies signed an agreement that settled all disputes and committed them to a CDMA third-generation standard. Qualcomm also sold Ericsson its terrestrial CDMA wireless infrastructure business and research plants in San Diego and Boulder, Colo., for $166 million.

Moreover, Qualcomm notched record earnings in its most recent fiscal quarter. Revenue was 23% higher than for the same quarter last year: $932 million compared with $760 million. Since it signed the Ericsson agreement, Qualcomm's stock has jumped from the $90 range to the $200 neighborhood.

"It's tough to find fault with anything they've done, since they just finished a phenomenal quarter and signed a deal with Ericsson that's important for them and the future of the wireless industry," said Mark Cavallone, an analyst at S&P Equity Group in New York.

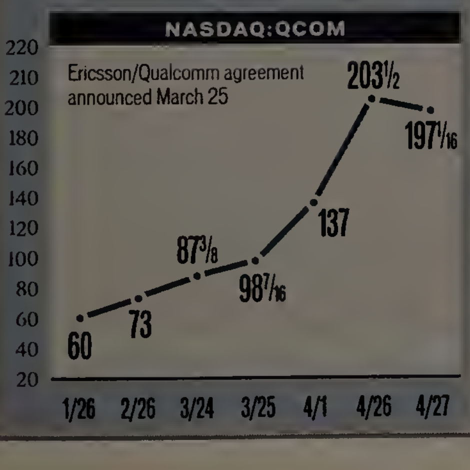
Cavallone and three other analysts rated Qualcomm a Buy or a Strong Buy.

The single CDMA third-generation standard, expected to be commercially available in 2000, will permit wireless data rates that range from 344K to 1.25M bit/sec., far above the current limit of 19K bit/sec., said Mark Roberts, an analyst at Everen Securities Inc. in San Francisco. Analysts expect Qualcomm to generate the bulk of its revenue from CDMA royalties and chip sets. New products such as the company's pdQ line of smart phones (see story, page 64) are expected to contribute relatively little income.

The only risk in the deal is that Ericsson will inherit several hundred Qualcomm workers but doesn't offer the same stock options as Qualcomm, said Wojtek Uzdelewicz, an analyst at S. G. Cowen & Co. in Boston. "It's a very different culture for the former Qualcomm employees, and that creates some risk," he says. ▶

Soaring Stock

The deal with Ericsson and a strong quarter catapulted Qualcomm's stock:



SOFTWARE UP 2.3%

EXCH	52-WEEK RANGE			APRIL 30 2 PM	WK NET CHANGE	WK PCT CHANGE
ADBE	66.50	23.62	Adobe Systems Inc. (H)	63.50	-0.25	-0.4
AZPN	56.87	6.12	Aspen Technology Inc.	8.81	0.06	0.7
ADSK	49.43	21.62	Autodesk Inc	28.81	2.25	8.5
AVID	47.75	11.06	Avid Technology	16.25	1.63	11.1
BOBJ	42.50	6.12	Businesss Objects S.A	23.81	-0.56	-2.3
CDN	39.00	10.62	Cadence Design Systems	13.63	0.88	6.9
CBTSY	63.87	6.68	CBT Group Plc.	15.38	2.38	18.3
CHKPF	56.00	10.87	Checkpoint Software	35.31	-1.44	-3.9
CTXS	53.75	23.12	Citrix Systems Inc.	43.69	5.69	15.0
COGNF	28.25	14.75	Cognos Inc.	23.97	-0.41	-1.7
CA	61.93	26.00	Computer Associates	42.69	2.94	7.4
CPWR	40.00	16.37	Compuware Corp	25.88	1.38	5.6
DCTM	55.75	9.37	Documentum	16.44	-0.94	-5.4
EFII	48.75	13.50	Electronics For Imaging (H)	45.88	-0.50	-1.1
HNCS	47.12	13.75	Hnc Software	21.44	0.19	0.9
IDXC	55.75	12.43	IDX Systems	16.63	1.13	7.3
IFMX	14.00	3.50	Informix Software Inc.	7.38	-0.69	-8.5
INTU	110.75	34.18	Intuit	84.00	-9.13	-9.8
JKHY	55.00	26.43	Jack Henry Associates	33.13	1.38	4.3
JDEC	49.50	10.87	J.D. Edwards & Co.	13.63	0.13	0.9
LGTO	67.75	23.50	Legato Systems Inc.	40.75	-2.06	-4.8
MACR	50.00	12.31	Macromedia Inc.	39.63	-1.00	-2.5
MANU	62.25	5.25	Manugistics Group Inc.	7.75	-0.25	-3.1
MENT	15.06	5.43	Mentor Graphics	12.06	-0.81	-6.3
MSFT	95.62	40.93	Microsoft Corp.	81.19	-5.25	-6.1
NETA	67.68	10.06	Network Associates	13.25	0.75	6.0
GMH	57.87	30.37	Network General	54.94	2.44	4.6
NOVL	28.12	9.43	Novell Inc.	22.13	-1.88	-7.8
ORCL	41.18	12.25	Oracle Corp.	27.06	0.25	0.9
PMTC	36.31	8.50	Parametric Technology Corp.	12.50	-0.56	-4.3
PSFT	52.12	11.50	PeopleSoft Inc.	13.56	0.44	3.3
PIXR	66.00	27.50	Pixar	42.75	-1.00	-2.3
PLAT	34.31	9.00	Platinum Technology Inc.	25.75	0.63	2.5
RATL	35.62	10.50	Rational Software Corp	29.50	-1.56	-5.0
SAP	60.12	23.75	SAP AG	31.44	2.31	7.9
SCUR	29.00	3.75	Secure Computing Corp	4.13	0.19	4.8
SE	48.75	20.12	Sterling Commerce Inc.	31.63	1.50	5.0
SSW	32.81	18.56	Sterling Software Inc.	20.44	0.31	1.6
SDRC	29.00	7.50	Structural Dynamics Research	19.50	0.56	3.0
SYBS	11.62	4.50	Sybase Inc.	7.56	-1.00	-11.7
SYMC	32.62	8.68	Symantec Corp.	19.91	0.66	3.4
SNPS	61.25	24.50	Synopsis	47.94	2.19	4.8
SCTC	30.87	7.81	Systems & Computer Technology	13.88	1.50	12.1
BAANF	48.50	6.87	The Baan Co. N.V.	9.44	0.56	6.3
VNTV	37.37	5.00	The Vantive Corp.	8.00	1.56	24.3
TSAI	51.00	26.00	Trans. Sys. Arch. (L)	32.38	2.13	7.0
VRTS	90.12	23.75	Veritas Software Corp	69.50	-4.38	-5.9
WIND	34.43	11.25	Wind River Systems Inc.	15.19	2.44	19.1

TELECOMMUNICATIONS CARRIERS OFF -0.9%

EXCH	52-WEEK RANGE			APRIL 30 2 PM	WK NET CHANGE	WK PCT CHANGE
ATI	102.68	42.25	Airtouch Communications	95.13	-1.56	-1.6
AT	72.43	38.25	Alltel Corp.	67.31	-3.56	-5.0
AIT	69.93	41.50	Ameritech Corp. (H)	68.63	0.63	0.9
ANDW	23.18	10.37	Andrew Corp.	14.00	-0.50	-3.4
T	64.12	32.25	AT&T	51.25	-1.81	-3.4
BCE	51.06	25.62	BCE, Inc.	45.56	-3.44	-7.0
BEL	61.18	40.43	Bell Atlantic	57.06	-1.81	-3.1
BLS	50.00	31.50	Bell South	44.31	-0.19	-0.4
CSN	23.43	8.50	Cincinnati Bell Inc.	22.69	0.56	2.5
CMCSK	78.43	33.62	Comcast	63.19	-5.56	-8.1
CQ	42.12	21.75	Comsat Corp.	32.75	1.38	4.4
COX	82.56	41.50	Cox Communications Inc.	78.25	3.25	4.3
GSTRF	36.12	8.31	Globalstar Telecom. Ltd.	20.00	0.00	0.0
GTE	71.81	46.56	GTE Corp	66.63	-0.25	-0.4
NXTL	42.50	15.37	Nextel Communications	40.31	1.56	4.0
SPOT	60.00	26.37	Panamsat	33.88	3.31	10.8
QCOM	218.50	37.75	Qualcomm (H)	205.63	11.94	6.2
SBC	59.93	35.00	SBC Communications	56.19	0.81	1.5
FON	114.62	54.43	Sprint Corp.	103.69	-3.19	-3.0
TDS	62.93	30.62	Telephone and Data Systems (H)	60.00	-0.38	-0.6
USW	66.00	46.81	US West	52.25	-3.38	-6.1
VIA	48.75	24.62	Viacom	41.25	-3.56	-7.9
WCII	54.62	10.25	Winstar Communications Inc.	48.25	1.56	3.3
WCOM	94.87	39.00	MCI Worldcom Inc. (H)	82.50	-8.19	-9.0

SERVICES UP 1.7%

EXCH	52-WEEK RANGE			APRIL 30 2 PM	WK NET CHANGE	WK PCT CHANGE
ACXM	31.25	16.50	Acxiom Corp.	25.63	0.13	0.5
ACS	51.75	22.37	Affiliated Computer Servs	38.63	-1.63	-4.0
AMSY	40.25	19.25	American Mgt. Systems	34.13	1.50	4.6
AUD	46.87	30.81	Automatic Data Processing (H)	44.56	-0.13	-0.3
BSYS	59.37	35.25	Bisys Group, Inc.	52.00	-4.25	-7.6
CATP	58.37	10.62	Cambridge Technology Ptnrs	14.63	1.00	7.3
CEN	40.50	24.00	Ceridian	35.38	-0.63	-1.7
CBR	40.87	13.31	Ciber Inc	19.00	-0.31	-1.6
CDO	30.87	10.75	Comdisco	27.00	1.13	4.3
CHRZ	44.75	9.25	Computer Horizons Corp	14.19	1.13	8.6
CSC	74.87	46.25	Computer Sciences	59.63	4.69	8.5
DST	70.56	34.00	Dst Systems Inc.	58.94	-3.88	-6.2
EDS	56.12	30.43	Electronic Data Systems (H)	53.06	-0.50	-0.9
FDC	46.25	19.68	First Data Group	43.56	-1.13	-2.5
FISV	59.63	36.75	Fiserv (H)	59.25	5.25	9.7
IT	35.62	17.31	Gartner Group	19.19	-0.13	-0.6
KEA	60.93	17.25	Keane	25.38	2.75	12.2
NDC	55.25	26.18	National Data	45.44	0.81	1.8
PAYX	55.06	33.12	Paychex, Inc	50.75	-2.00	-3.8
REGI	23.87	4.00	Renaissance Worldwide	6.63	0.78	13.4
REY	23.31	12.62	Reynolds & Reynolds	23.00	1.81	8.6
SFE	120.00	17.12	Safeguard Scientifics	82.81	-5.50	-6.2
SAPE	82.87	24.25	Sapient Corp.	61.63	1.63	2.7
SMS	86.50	40.06	Shared Medical Systems	55.38	-1.88	-3.3
SDS	41.93	21.68	Sungard Data Systems	32.88	-0.19	-0.6
SYNT	32.62	8.68	Syntel Inc.	19.91	0.66	3.4
TECD	53.12	14.50	Tech Data	22.94	-0.38	-1.6
TSS	26.25	14.43	Total System Services, Inc	19.25	-0.44	-2.2
TSAI	51.00	26.00	Transaction Sys. Architects (L)	32.38	2.13	7.0

NETWORK UP 1.9%

EXCH	52-WEEK RANGE			APRIL 30 2 PM	WK NET CHANGE	WK PCT CHANGE
COMS	51.12	20.00	3Com Corp	26.13	0.00	0.0
ADCT	52.25	15.75	ADC Telecommunications Inc	47.31	0.81	1.7
ANTC	29.68	11.50	Antec	26.88	2.00	8.0
ASND	102.56	32.62	Ascend Communications Inc	95.00	-1.94	-2.0
BNYN	19.37	2.12	Banyan Systems Inc	12.38	-2.13	14.7
CS	15.31	6.62	Cabletron Systems	9.38	1.00	11.9
CNEBF	20.00	5.75	Call-Net Enterprises	6.97	-0.09	-1.3
CSCO	120.00	41.12	Cisco Systems Inc	112.00	-2.44	-2.1
ECILF	45.00	19.75	ECI Telecom	37.38	1.88	4.8
FORE	34.62	9.25	Fore Systems Inc (H)	33.63	9.00	36.5
HRS	52.43	27.31	Harris Corp	34.19	0.50	1.5
GMH	57.87	30.37	Hughes Electronics/GM	54.94	2.44	4.6
ERICY	34.00	15.00	LM Ericsson	26.63	0.84	3.3
LU	67.00	26.68	Lucent Technologies	59.06	2.06	3.4
MADGF	7.43	1.75	Madge Networks	2.88	0.44	17.9
NCDI	9.62	4.37	Network Computing Dev	5.06	0.06	1.3
NWK	20.62	7.31	Network Equipment Tech	7.81	0.00	0.0
NN	39.87	15.43	Newbridge Networks	36.56	1.25	3.5
NOK	85.68	29.50	Nokia Corp	76.25	3.63	4.5
NT	76.25	26.81	Northern Telecom Ltd.	68.25	-3.63	5.0
PAIR	20.12	6.00	Pairgain Technologies Inc	12.75	0.44	3.6
PCTL	11.93	4.31	Picturetel	8.06	0.56	7.5
SFA	35.00	11.75	Scientific Atlanta	31.38	3.08	10.8
TLAB	120.25	31.37	Tellabs Inc. (H)	108.63	4.94	4.3
USW	66.00	46.81	US West	52.25	-3.38	-6.1
VRLK	9.37	2.12	Verilink	2.88	-0.56	16.4
WSTL	12.12	2.75	Westell Technology Inc.	6.38	0.31	5.2
XYLN	37.00	9.62	Xylan	36.94	0.00	0.0

SEMICONDUCTORS, CHIPS & EQUIPMENT OFF -5.2%

EXCH	52-WEEK RANGE			APRIL 30 2 PM	WK NET CHANGE	WK PCT CHANGE
ADPT	26.75	7.87	Adaptec	24.25	2.44	11.2
AMD	33.00	9.31	Advanced Micro Devices	16.50	-0.69	-4.0
ALTR	82.31	28.25	Altera (H)	72.81	-8.19	-10.1
ADI	39.62	12.00	Analog Devices	36.00	-0.88	-2.4
AMAT	71.62	21.56	Applied Materials	53.44	-8.19	-13.3
ASML	50.37	12.93	ASM Lithography Holding	39.00	-8.13	-17.2
HRS	52.43	27.31	Harris Corp.	34.19	0.50	1.5
INTC	71.87	32.87	Intel Corp.	60.69	-2.13	3.4
KLAC	65.00	20.75	Kla Instruments	50.25	-5.94	-10.6
LLTC	64.12	19.56	Linear Technology (H)	56.94	-5.19	-8.4
LSI	38.31	10.50	LSI Logic	34.31	-1.00	-2.8
MXIM	65.12	22.31	Maxim Integrated Products (H)	57.13	-6.13	-9.7
MU	80.56	20.06	Micron Technology	37.38	0.25	0.7
MOT	86.00	38.37	Motorola	77.69	-3.19	-3.9
NSM	22.87	7.43	National Semiconductor	12.94	-0.06	-0.5
STM	121.68	35.87	SGS-Thomson Microelectronics	103.50	-7.00	6.3
SLR	56.25	17.68	Solectron Corp.	49.00	-1.31	-2.6
TER	66.50	15.00	Teradyne	50.31	-6.50	-11.4
TXN	115.25	45.37	Texas Instruments (H)	103.50	-5.00	-4.6
UNPH	136.00	31.25	Uniphase	117.38	-3.88	-3.2
VTSS	59.00	17.12	Vitesse Semiconductor Corp	46.50	-4.38	-8.6
XLNX	54.37	14.87	Xilinx	45.38	-2.63	-5.5

COMPUTER SYSTEMS UP 1.6%

EXCH	52-WEEK RANGE			APRIL 30 2 PM	WK NET CHANGE	WK PCT CHANGE
AAPL	47.31	25.62	Apple Computer Inc.	45.88	7.78	20.4
ASPX	12.50	1.62	Auspex Systems	7.56	-0.94	-11.0
CPQ	51.25	22.56	Compaq	22.69	-0.56	-2.4
DGN	21.81	7.00	Data General	11.81	0.94	8.6
DELL	55.00	19.06	Dell Computer Corp.	40.63	-2.19	-5.1
GTW	84.50	36.12	Gateway 2000 Inc.	67.25	-1.38	-2.0
HWP	83.87	47.06	Hewlett-Packard Co.	79.31	2.00	2.6
HIT	78.93	40.18	Hitachi Ltd	73.50	1.88	2.6
IBM	215.25	106.00	IBM (H)	207.75	5.69	2.8
MUEI	24.75	9.37	Micron	10.31	-0.25	-2.4
MOT	86.00	38.37	Motorola	77.69	-3.19	-3.9
NATI	35.87	17.50	National Instruments Corp.	33.50	5.00	17.5
NCR	55.75	23.50	NCR	41.00	-2.06	-4.8
NIPNY	60.50	31.00	NEC	59.06	1.69	2.9
PRCM	13.25	3.50	Procom Tech Inc.	4.44	0.06	1.4
SQNT	20.09	5.68	Sequent Computer Systems	10.94	2.19	25.0
SGI	20.87	7.37	Silicon Grafix	12.88	-0.13	-1.0
SNE	104.31	60.25	Sony	93.19	-3.06	-3.2
SUNW	72.50	19.18	Sun Microsystems	59.13	-3.63	-5.8
TEXM	5.93	2.00	Texas Micro	4.50	-0.13	-2.7
TRCD	4.87	0.37	Tricord Systems	2.06	-0.19	-8.3
UIS	36.37	17.62	Unisys	31.13	1.00	3.3

INTERNET OFF -0.7%

EXCH	52-WEEK RANGE			APRIL 30 2 PM	WK NET CHANGE	WK PCT CHANGE
AMZN	221.25	13.37	Amazon.com (H)	169.00	-38.56	-18.6
AOL	175.50	17.25	America Online	143.25	2.75	1.9
ATHM	198.00	23.50	@home Corp.	140.13	-17.75	-11.2
CKFR	69.12	5.75	Checkfree	49.25	1.75	3.7
CYCH	24.87	5.87	Cybercash, Inc.	15.75	-2.19	-12.2
EDFY	15.00	3.81	Edify Corp	9.69	1.75	22.0
EGRP	144.50	5.00	ETrade Group Inc.	114.63	12.25	12.0
XCIT	187.87	18.00	Excite, Inc.	142.00	-12.88	-8.3
SEEK	100.00	14.87	Infoseek	51.25	-6.25	-10.9
LCOS	145.37	20.06	Lycos, Inc	98.00	3.00	3.2
OMKT	27.00	4.25	Open Market, Inc	13.50	-0.44	-3.1
OTEX	42.50	10.00	Open Text Corp.	37.56	3.06	8.9
PSIX	73.75	8.37	PSINet Inc.	50.50	-9.50	-15.8
SDTI	30.62	5.43	Security Dynamics	21.25	1.81	9.3
SPYG	32.25	8.62	Spyglass Inc.	18.19	2.88	18.8
YHOO	244.00	24.87	Yahoo Inc	174.88	-11.88	-6.4

STORAGE & PERIPHERALS UP 0.7%

EXCH	52-WEEK RANGE			APRIL 30 2 PM	WK NET CHANGE	WK PCT CHANGE
ADPT	26.75	7.87	Adaptec Inc.	24.25	2.44	11.2
APCC	55.50	26.18	American Power Conversion	33.00	-1.00	-2.9
CANNY	25.93	17.00	Canon Inc.	24.25	-0.50	-2.0
DBD	44.06	19.12	Diebold Inc	24.38	0.81	3.4
EK	88.93	60.81	Eastman Kodak Co	78.00	3.69	5.0
EMC	135.00	40.18	EMC	107.56	-1.56	1.4
IOM	10.18	2.93	Iomega	4.88	-0.13	-2.5
LXK	128.50	50.75	Lexmark International	126.06	7.94	8.7
QNTM	29.93	10.81	Quantum	17.69	-0.88	-4.7
SEG	44.25	16.12	Seagate Technology	27.25	1.19	4.2
STK	51.12	17.25	Storage Technology (L)	19.00	1.19	6.7
TEK	43.68	13.68	Tektronix	24.44	-1.13	4.4
XRX	63.00	39.00	Xerox	57.25	0.69	1.2

KEY: **(H)** = New annual high reached in period
(L) = New annual low reached in period

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Hess Taps Linux

said. The application is about 2 million lines of code and might have taken years to rewrite for Windows, he said. "We thought about that for three nanoseconds."

When oil prices reached the lowest point of the 1990s late last year, Forsyth said, the New York-based, $6.6 billion oil company made the leap to Linux, even though many CIOs still regard the operating system as too untested to be trusted with even comparatively meager jobs like file serving.

But after the geophysicists sold their business unit's vice president on the idea of using Linux, the information technology department became willing to embrace the effort as well, said senior systems programmer Jeffrey R. Davis. Hess' IT culture is end-user-driven, he said.

Forsyth and Davis said the company had been eyeing Linux for years, but the company wanted to see Linux mature more, Davis said. Red Hat Software Inc.'s more recent distributions of the operating system made it easy enough to install and manage, Davis said. Even so, Hess programmers had to write some custom applications to manage the clusters to approximate the management capabilities that are included with the SP2. "If I can save $1 million, I'll write a few programs," Davis said.

Amerada Hess implemented one Linux system from Bethlehem, Pa.-based Paralogic Inc. last fall, bought another from Dell Computer Corp. at the beginning of the year and ordered a third from Dell last week. The latest one will cluster 32 500-MHz Pentium III processors and sport 1G byte of RAM on each processor's system board.

As strategic as oil exploration is for companies, it isn't a sacred cow when budgets must be brought in line with slumping oil prices, said Steve Enger, an oil industry analyst at Petrie Parkman & Co. in Denver. "The companies have been working pretty diligently, in some cases for many years, to try to reduce costs," he said. Amerada Hess, for instance, is spending only $250 million on exploration this year compared with $400 million last year, a 37.5% cut.

There are benefits beyond the cost difference, Forsyth said. Amerada Hess owns the hardware rather than leases it, can now sublease the SP2, can upgrade each node in the Linux cluster with more commodity components and can eventually salvage each node for use in a PC after an upgrade.

Meanwhile, he said, Amerada Hess can reinvest its savings in buying better seismic data, which can in turn produce more accurate images, which increase the company's chance of finding oil.

Linux-based Beowulf clusters have become popular supercomputers at several national laboratories, government agencies and universities. But they have been rare in the private sector because CIOs have only begun to consider Linux a reliable, supportable operating system.

In one project at the University of Texas at Austin, researchers in the Department of Petroleum and Geosystems Engineering have found that a Beowulf cluster with 16 400-MHz Pentium II processors could perform oil-reservoir simulation calculations about as quickly as a comparable SP2. ◗

Continued from page 1

LAN Gear

to be up all the time and PCs to crash. But with Y2K, it doesn't matter if PCs are up if the network isn't — because they won't be able to get to anything else," said Michelle Famiglietti, LAN/WAN analyst at Safety-Kleen Corp. in Columbia, S.C.

Y2K errors in LAN components can cause everything from network congestion and degraded performance to total LAN failure, said Neil Rickard, an analyst specializing in that area at Gartner Group Inc. in Stamford, Conn. "The impact can be devastating."

Internetworking equipment such as routers, switches and hubs have real-time clocks or use operating systems that — like their computer brethren — rely on two-digit dates that won't be able to discern between 1900 and 2000. But there are ways to address the problem (see chart).

Safety-Kleen, a waste services firm, used a network discovery and Y2K-readiness assessment software package from Concord, Mass.-based NetSuite Development Corp. to inventory and determine the status of its internetworking equipment.

The company found that it needed to upgrade code on two Cisco Systems Inc. routers. The code was free because the devices were covered under a software maintenance contract with Cisco, Famiglietti said.

Observers and users said many companies didn't start considering the impact of year 2000 on their networks until about a year ago. That's because companies first addressed Cobol mainframe applications, desktop PCs and related applications.

"It's true that many companies are just getting to their networks now because they were either busy with large-scale mainframe work or because the level of awareness of [the] implications for networks wasn't there," said a Y2K project manager at a Northeastern insurance company. "When we first started to ask vendors for help a year ago, they told us we were among the very first to ask about this issue."

Many companies didn't start exploring the issue until 18 months ago, said Carl Greiner, an analyst at Meta Group Inc. in Stamford, Conn. "It's still not too late and is something companies absolutely have to focus on," he said.

For their part, Cisco, 3Com Corp., Nortel Networks and Cabletron Systems Inc. have long posted the year 2000 status of both current and discontinued products on their Web sites. Users said that information has been extremely helpful.

Some users don't fault the Big 4 for not testing discontinued products — some of which are only a few years old — and for requiring upgrades to Y2K-compliant software releases.

"I have no issue with what the vendors have done and think they've been pretty upfront on their product status," said Gregory Parham, executive director of the Y2K program office at the U.S. Department of Agriculture in Washington.

Companies that upgrade or replace their equipment and software usually face a much smaller risk.

"Our policy is not to leave our network infrastructure in place for that long," said Steve Lopez, network manager at the National Board of Medical Examiners in Philadelphia. ◗

Y2K Survival Kit

Tips for dealing with year 2000 bugs and networks:

- Inventory existing equipment
- Collect model numbers, software release version information
- Consult vendor Web pages to check Y2K-readiness status
- Investigate vendors' upgrade, discount programs
- Test equipment and software (optional)
- Test devices together as a system

Wall Street Passes Y2K Test Run

BY THOMAS HOFFMAN

A series of industrywide year 2000 tests involving about 400 brokerages, clearinghouses and stock exchanges yielded fewer errors than normally occur on a typical trading day.

Observers said the results were encouraging, but the tests by the Securities Industry Association (SIA) didn't include leap-year testing, nor did they involve overseas banks or stock exchanges.

The results, released last week, showed that Y2K-related problems affected only 0.02% of the 260,000 or so transaction pieces. A typical trade might involve 25 or more of those steps, said Donald Kittell, executive vice president of the SIA.

Meanwhile, non-Y2K-related errors, such as data-entry and communication errors between firms, affected 2.5% of the transaction components.

The error rates from six weekend tests conducted in March and April were lower than the rate that occurs on a normal trading day, said John Panchery, vice president of information systems at the SIA. Transaction processing errors occur every day, but they're usually caught quickly and typically don't affect a trading position or the overall market. ◗

Y2K Water Safety Worries Feds

BY PATRICK THIBODEAU

In a report released last week, the U.S. General Accounting Office said little is known about the year 2000-readiness of water and wastewater treatment facilities. Therefore, systems may be vulnerable to failures, the report said.

Responses by water suppliers to industry surveys have been low, and Congress may have to force water suppliers to disclose their progress, the report added.

But John Robert Carman, water quality manager of the Metropolitan Water District of Salt Lake City, said water companies should have few Y2K problems. That's because most water systems predate computers, he said. And for those companies that use computer control systems, most sit on top of manual systems that can be reactivated, he said.

Carman said his larger fear is interruption of power or of the delivery of chemicals used to treat water. The 350,000-customer Utah utility has a two-month supply of diesel fuel for its generators, he said. ◗

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THE BACK PAGE

FRANK HAYES/FRANKLY SPEAKING

Spread the word

BY NOW, YOU'VE probably already written your report on the Chernobyl virus for top management. You *did* write a report, right? If you didn't — why not? It's the worst computer-virus catastrophe in history. Your IT policies and investment in antivirus software likely saved your organization from a total shutdown and a financial bloodbath. And if you're not taking credit for your part in the successful defense against Chernobyl, you shouldn't wonder that IT gets no respect among the business types in your organization.

If you don't tell them, they won't know. Your businesspeople probably heard doomsday warnings about Chernobyl — a.k.a. the CIH virus (see story, page 25) — before it hit and then a big collective yawn from the media the day after. *The Wall Street Journal* called Chernobyl a "dud" in a story buried deep inside the paper. CNN said it was "no big deal."

That's probably all your businesspeople and top management know about Chernobyl.

In the U.S., IT averted a Chernobyl catastrophe.

But news reports from the rest of the world tell a different story. In mainland China, at least 100,000 PCs were infected by the virus. In South Korea, the toll was more than 250,000 machines, with damage estimated at upward of $250 million.

In India, major industries, banks and publishing companies shut down last Monday to avoid damage. In Cairo, entire companies sent workers home because their systems crashed.

In Israel, Chernobyl hit a major financial institution and an intelligence organization. In Turkey, it took out an airport in Izmir, a military academy in Ankara, police departments, government offices, banks and the state-run radio and television station. In the Philippines, victims included companies in the telecommunications, banking, manufacturing, insurance and power generation industries.

Some dud, huh?

A conservative count put the number of computers affected worldwide at about 700,000 — dwarfing the 100,000 PCs hit by the Melissa virus a month ago. And unlike Melissa, Chernobyl didn't just clog networks with nuisance e-mail. Chernobyl destroyed data. It ate motherboards alive. The total cost, including repairs, lost data, lost time and lost business, should easily top $1 billion.

That's the bullet your company dodged last Monday. And make no mistake, it's your IT shop that pulled the company out of that bullet's path — with antivirus tools, careful hardware control and tight policies for what software is allowed on your users' PCs.

Of course, your competitors across the street did a good job, too — few U.S. companies were hit. But your competitors around the globe didn't do so well. That's competitive advantage, thanks to IT.

We don't usually get that kind of chance to see how well we've done at using IT to avoid disaster. Usually, we can only guess about what might have happened.

But this time, we know. We can see it in workers sent home in Cairo and whole industries shut down in India. We've got hard evidence in the banks, manufacturers and government agencies shut down around the world.

That's real business benefit from IT. It's the ultimate return on investment: business as usual instead of catastrophe. But top management won't know unless you tell them. Remember, all they've heard is that this big-deal Chernobyl virus turned out to be no big deal. They probably figure it's just another empty scare, another case of IT people crying wolf.

So write that report. Make sure your executives find out what happened to organizations that didn't make the necessary IT investments to protect themselves. And make sure your users know how bad it could have been — and, for some companies, how bad it was.

If you don't tell them, who will? ◗

Hayes, Computerworld*'s staff columnist, has covered IT for 20 years. His e-mail address is frank_hayes@computerworld.com.*

SHARK TANK

DID I TELL YOU about the time I had two MiGs on my tail and had to punch out in a hurry, 8 miles above the Red Sea? Whoops, that wasn't me, that was Lotus' Jeff Papows. Whoops, it wasn't Papows, either (see Briefs, page 8). I tell you, pretty soon these vendor execs will be taking truthfulness lessons from politicians.

OR TESTIMONY LESSONS: Here's part of a just-released antitrust deposition from James Allard, Microsoft's hotshot Internet strategist: Q: "Did you have any concerns that the Web might 'grow into a rich application platform in an operating system-neutral way' in May 1995"? Allard: "Could you define *Web*?"

MIXING KNOWLEDGE MANAGEMENT WITH R/3 strikes the Tank as truly inhumane. But well-placed pilot fish swear that SAP plans (maybe as early as this week) to jump into the ultra-squishy knowledge management field with both a stand-alone app and Web-based knowledge management software that coaches end users who don't grok R/3 classroom training. Let's see: Nobody gets R/3, so you put in training. Then nobody gets the training, so knowledge management saves the day. Uh-huh.

MORE PEOPLE-WATCHING: Remember Clive Sinclair, the eclectic, eccentric Brit who made his wad from those cheap Timex-Sinclair home computers? He got knighted, invented an electric car, almost married a lap-dancer, and now the British tabloids say he's mulling a comeback in the form of (drum roll) cheap, Linux-based PCs. Clive vs. Bill. We can only hope.

BEANS SPILLED: Starbuck's CEO and Chairman Howard Schultz said last week the coffee slinger is brewing up a "multibillion-dollar" cybercommerce entry, due to hit in the third quarter. Now that will be a grande Web site. Or is it a venti?

FIRST, A 13-YEAR-OLD New Jersey kid bids $3.1 million at the eBay auction site (he snagged a '71 Corvette for $24,500 but couldn't pay for it). Now 16 disgruntled Silicon Valley employees are selling *themselves* at the site. Asking price: $3.14 million for the group. But you don't get to see their résumés until after you pay up – they're afraid their boss will fire 'em if he finds out.

AT LEAST THE CREATOR OF THE CHERNOBYL VIRUS, originally called CIH, seems like an honest guy. Reportedly, the perp was a Taiwanese student named Chen Ing-hau, and – you guessed it – the virus bears his initials. He's now in the Taiwanese military (Really).

To dime out anybody who's been fudging, fibbing or fabricating, shoot anonymous e-mail to **sharky@computerworld.com.**

The 5th Wave

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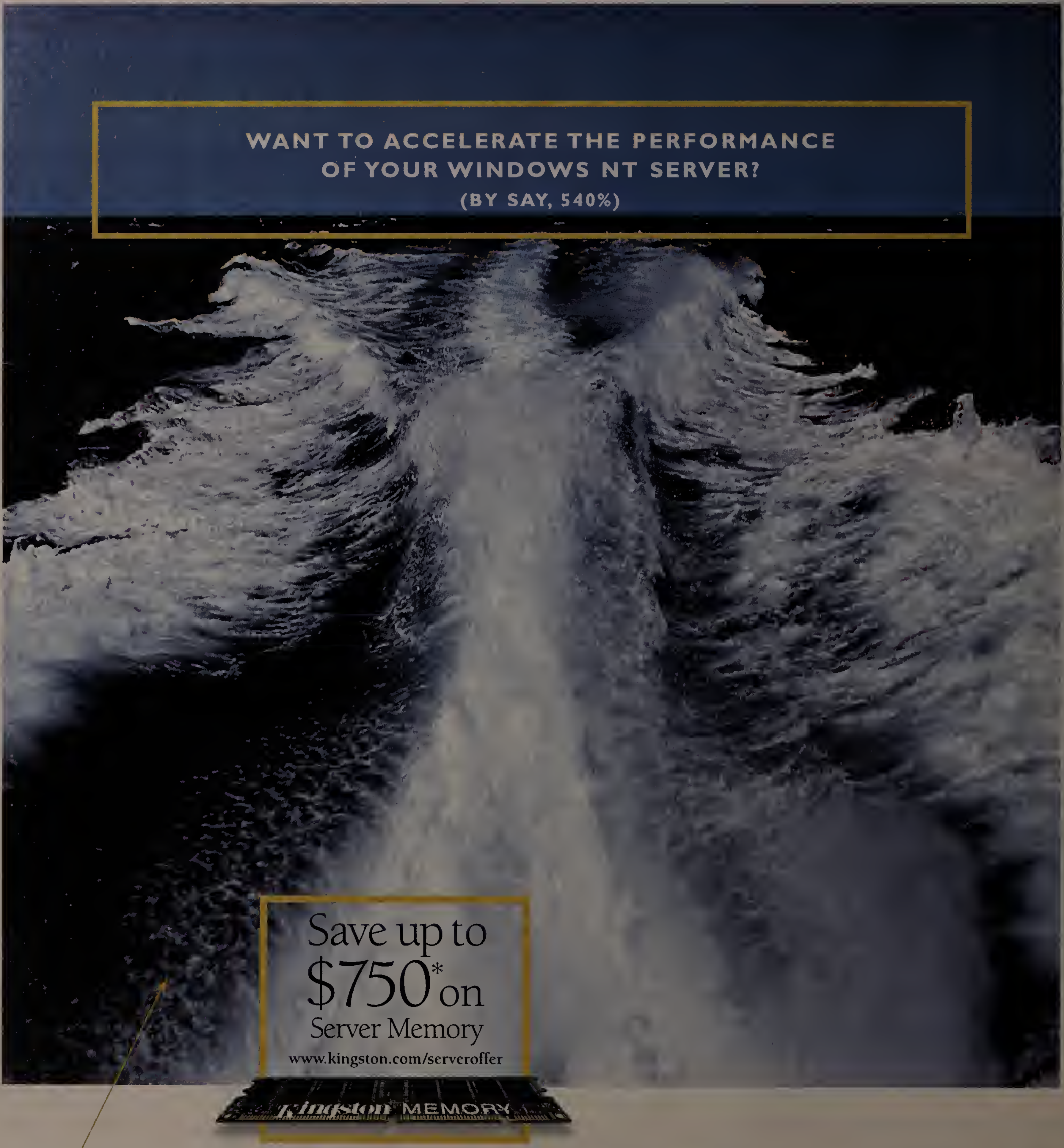
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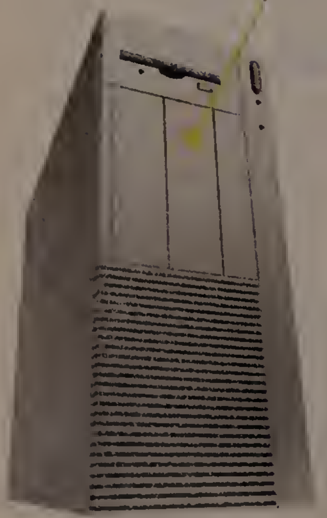

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